

PROSPECTS FOR THE UK ECONOMY

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Introduction

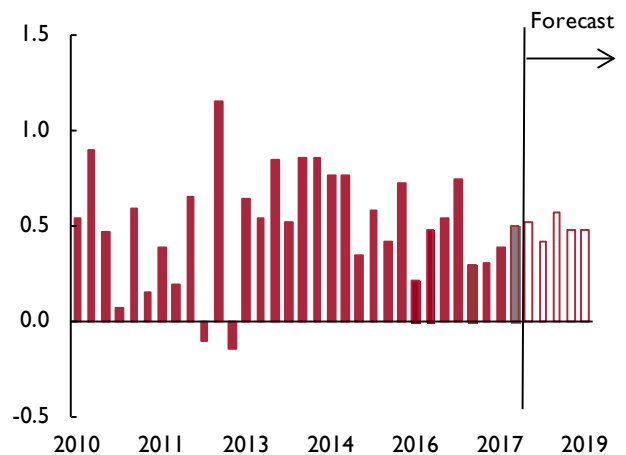
The UK economy has strengthened since the middle of 2017 (figure 1). Growth has been supported by a buoyant global economy and the weak exchange rate, which together have helped rebalance overall growth away from domestic demand and towards net trade. This rebalancing remains a key feature of our forecast.

Our forecast for real GDP growth is a little below 2 per cent for this year and next year, which is slightly faster than our previous forecast and also a little above its speed limit. The revision is mainly driven by a more positive outlook for the global forecast and also because of progress in Brexit negotiations which helps lift the fog of uncertainty that has weighed down on business investment. As before, inflation eases gradually towards the target rate of 2 per cent over the next eight quarters. We see the Monetary Policy Committee (MPC) remain on a gradual path of normalisation with a rate increase every six months until Bank Rate reaches 2 per cent in 2021.

The first phase of the Brexit negotiations finally reached a conclusion in December with an agreement in principle in three key areas: the Irish border, EU citizens' rights and the financial settlement (Box A). The European Council declared that substantial progress had been made, thus paving the way for the next phase of negotiations that seeks to define the new relationship. Sterling appreciated in response to a perceived lessening in the risk of a cliff-edge scenario. Brexit nevertheless remains a key political and economic risk for the UK.

Although there was no specific discussion of a new trading relationship in this first phase, the progress report underscored the importance of the Good Friday agreement and the need to maintain a free border between the Republic of Ireland and Northern Ireland for people and commerce, and a similar arrangement between Northern Ireland and the rest of the UK. In our judgement, the pressure to maintain a borderless Ireland increases the likelihood of a 'soft Brexit' where the UK achieves close to full access to the EU market. The key

Figure 1. Real GDP growth (per cent per quarter)



Source: Thomson Reuters Datastream, ONS, NIESR forecasts.

Note: ■ is the preliminary estimate.

*NIESR. E-mail: a.kara@niesr.ac.uk. Thanks to Jagjit Chadha, Iana Liadze and Yanitsa Kazalova for helpful comments and suggestions. We also thank Yanitsa Kazalova for compiling the database. Unless otherwise stated, the source of all data reported in the figures and tables is the NiGEM database and forecast baseline. The UK forecast was completed on 26 January 2018.

Table 1. Summary of the forecast

Percentage change

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---------------------------------|------|------|------|------|------|------|------|------|------|
| GDP | 3.1 | 2.3 | 1.9 | 1.8 | 1.9 | 1.9 | 1.7 | 1.6 | 1.6 |
| Per capita GDP | 2.3 | 1.6 | 1.1 | 1.2 | 1.3 | 1.2 | 1.1 | 1.1 | 1.1 |
| CPI Inflation | 1.4 | 0.1 | 0.7 | 2.7 | 2.7 | 2.1 | 2.0 | 2.0 | 2.1 |
| RPIX Inflation | 2.4 | 1.0 | 1.9 | 3.8 | 3.4 | 2.7 | 2.6 | 2.7 | 2.7 |
| RPDI | 1.0 | 5.3 | 0.2 | 0.2 | 1.5 | 1.9 | 1.9 | 1.7 | 1.6 |
| Unemployment, % | 6.2 | 5.4 | 4.9 | 4.4 | 4.3 | 4.3 | 4.5 | 4.5 | 4.6 |
| Bank Rate, % | 0.5 | 0.5 | 0.4 | 0.3 | 0.7 | 1.2 | 1.6 | 2.0 | 2.4 |
| Long Rates, % | 2.5 | 1.8 | 1.3 | 1.2 | 1.6 | 2.3 | 2.9 | 3.3 | 3.6 |
| Effective exchange rate | 7.6 | 5.5 | -9.7 | -5.1 | 1.9 | 0.2 | 0.0 | 0.0 | 0.0 |
| Current account as % of GDP | -5.3 | -5.2 | -5.8 | -4.6 | -4.2 | -3.5 | -3.2 | -2.8 | -2.5 |
| PSNB as % of GDP ^(a) | 5.3 | 4.2 | 2.8 | 2.5 | 1.8 | 1.2 | 0.9 | 0.4 | 0.0 |
| PSND as % of GDP ^(a) | 83.3 | 83.1 | 85.7 | 89.0 | 86.3 | 83.6 | 79.2 | 73.5 | 71.1 |

Notes: RPDI is real personal disposable income. PSNB is public sector net borrowing. PSND is public sector net debt. (a) Fiscal year, excludes the impact of financial sector interventions, but includes the flows from the Asset Purchase Facility of the Bank of England. Annual averages unless stated otherwise.

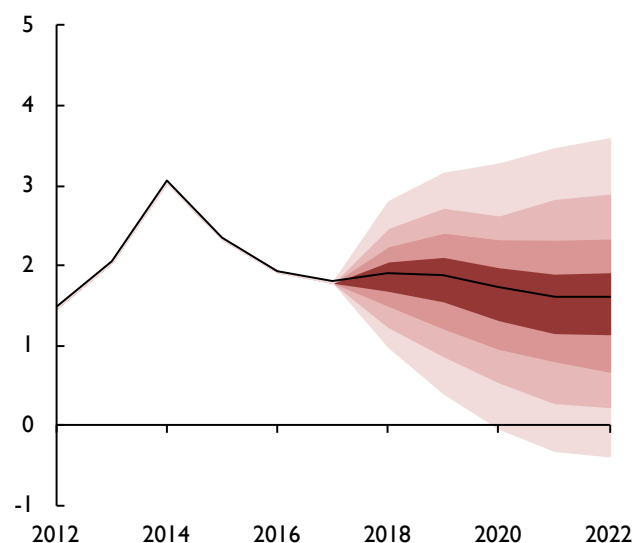
assumptions that define our soft Brexit scenario are discussed in Box B.

Full or close to complete market access will, in our view, come at a cost. We discuss the trade-offs facing the UK and the EU in Box C. To start with, EU leaders have insisted time and again that the UK will not be able to cherry pick among the four freedoms – movement of goods, services, capital and labour. What is more, the EU is also likely to demand that the UK makes a budgetary contribution for market access. Consistent with that, we assume in our central forecast that existing fiscal arrangements remain intact (the Brexit-specific assumptions that underpin our forecasts are discussed in Box B).

This is not an outcome that we believe will necessarily materialise, it is simply the one to which we assign a higher probability. After all, the red lines that have been drawn by both sides are deep, extensive and politically explosive. Navigating through these will require negotiators to be ingenious and politicians to compromise. The conditioning assumptions that underpin our forecasts will evolve as more information becomes available and the first instance is likely to be sometime in March when EU leaders set the broad parameters for the *Withdrawal Agreement* for EU Chief Negotiator Barnier.

Under our central scenario, economic growth is forecast at a little under 2 per cent over the next couple of years, slightly higher than our previous forecast and similar

Figure 2. GDP growth fan chart (per cent per annum)



Source: NiGEM database, NIESR forecast and NiGEM stochastic simulations. Notes: Each bound represents a cumulative decile of the probability distribution around the February 2018 forecast.

to the 1.8 per cent achieved in 2017 (figure 2). The revision is driven by the upgrade to global growth and also because the risks emanating from Brexit have eased after the successful conclusion of the Phase 1 agreement.

As before, we expect international trade to make a strong positive contribution to economic growth this year and next year in spite of the recent modest

Box A. Brexit – Phase I agreement

EU and UK negotiators announced a major breakthrough on 8 December, some six months after formal talks started, with an agreement in principle on the first phase of the Brexit negotiations.¹ The Phase I agreement was subsequently approved by the European Council. This is an important landmark not only because it settles a number of contentious issues, but also because the agreement opens the door to the second phase of the negotiations (Withdrawal Agreement) which will help define the future relationship between the EU and the UK. In our view, this Phase I agreement increases the likelihood of an orderly and soft Brexit.²

Before outlining the salient features of the agreement and its implications, it is worth emphasising that, as it stands today, this is not a binding agreement. The agreement will only come into force when it enters the final Withdrawal Agreement. That said, a fair amount of political capital has been spent in this process and on balance the prospects of a final agreement have been enhanced considerably.

The agreement covers three broad areas:

- 1) The financial settlement ('divorce bill'). The two sides have agreed a methodology for calculating the UK's outstanding commitments to the EU. We have, in line with past practice, adopted the OBR's assumptions for EU contributions but assuming that the UK makes a financial contribution in line with existing arrangements.
- 2) Protection of rights of UK citizens in the EU and EU citizens in the UK. Both sides will protect the rights of EU citizens that were derived from EU law until the date on which the UK ceases to be a member of the EU on 29 March 2019. This has implications for the population projections that we use in our forecast. We have adopted the new 'principal' projections published by the ONS in October. The ONS has not specifically considered a Brexit impact, but projected net migration is lower than the previous forecasts published in 2014.
- 3) A framework for addressing the position of Northern Ireland – the political desire to maintain a free and open border between the Republic and Northern Ireland and Northern Ireland and the rest of the UK increases the likelihood of a 'soft Brexit'.

Our focus is on the financial settlement and the position of Northern Ireland because these have direct budgetary and trade implications and indirect effects on whole economy productivity. This is not to say that the agreement on the rights of EU citizens is unimportant – it is because of its impact on net migration – it is just that we have maintained our standard practice and based our forecast on the latest ONS population projections.

Financial settlement

The financial settlement, which the press has frequently referred to as the 'divorce' or 'exit' bill, establishes the methodology for calculating the UK's outstanding financial commitments to the EU. To be sure, the agreement so far relates to the methodology and not a specific amount although the UK government has estimated that the financial settlement related to the Phase I agreement will be in the region of £35–£39 billion. The final amount will depend on a number of factors including the discount factor applied to the future stream of payments (e.g. for pensions), the outstanding commitments as of 2020, the exchange rate between British pound and the euro because the final settlement will be calculated and settled in euro etc. The schedule of payments will be discussed in the second phase although the Phase I agreement makes clear that the UK will not be required to make any payments earlier than if the UK had remained a member state. We have, as a result, adopted the latest OBR fiscal projections for EU contributions in our base case.

The settlement covers four key areas:

- 1) EU annual budget until 2020: The EU's annual budget is worth around 1 per cent of EU GNI and although the budget is agreed each year, it is set under the framework of the 7-year Multiannual Financial Framework (MFF). The UK will continue to contribute to the annual budget until the end of the current MFF which runs to 2020.
- 2) Outstanding commitments or *reste à liquider* (RAL): Each year the EU makes future spending commitments out of its annual budget. The UK will contribute its share of RAL outstanding as at 31 December 2020.
- 3) Liabilities: the UK will contribute its share of EU liabilities incurred before 31 December 2020. The bulk of these liabilities relate to the unfunded pensions of EU employees.

Box A. (continued)

4) Contingent liabilities: the UK will also be liable to the EU's contingent liabilities as of 29 March 2019, the date of withdrawal.

The settlement relates to commitments already made by the UK as a member of the EU and does not cover payments that the EU may demand for future access to the common market or for participating in programmes managed by the European Commission such as Horizon 2020. The EU may, as part of the Phase 2 negotiations additionally demand from the UK a financial contribution for imposing restrictions on EU migrants and on the jurisdiction of the European Court of Justice. That decision is likely to be politically driven rather than based on any simple formula. Our base case assumes budgetary contributions in line with the OBR's forecast until 2021. The UK continues to make a similar contribution beyond 2021 which is consistent with our broad view that the exit arrangements will be 'soft'.

Future trade

The agreement on the position of Ireland has broad implications for the final trade deal that might be struck in second phase of negotiations. Both sides recognise the importance of the 1998 Belfast Agreement in delivering peace to Northern Ireland and the risk to that from Brexit.

The agreement makes clear that the UK is committed to North-South cooperation and against a hard border. The priority is to achieve this through a comprehensive relationship with the EU as a whole. Should that not be possible, the UK will, according to the agreement, propose specific solutions for the island of Ireland and failing that, the UK will fully align with the "rules of the Internal Market and the Customs Union". Furthermore, the UK will "ensure that no new regulatory barriers develop between Northern Ireland and the rest of the UK" unless agreed by the Northern Ireland Executive and Assembly.

Both sides are committed to a deep and wide-ranging relationship between the North and the South that implies free movement of persons and no hard border and the UK additionally is committed to a similar relationship between Northern Ireland and the rest of the UK. This implies that the future relationship between the UK and the EU will be influenced as much by political considerations as economic and financial ones. Box C explains the potential trade-offs facing the UK and the EU in relation to market access, EU budgetary contribution and the free movement of labour.

NOTE

- 1 Joint report from the negotiators of the European Union and the United Kingdom Government on progress during phase I of the negotiations under Article 50 TEU on the United Kingdom's orderly withdrawal from the European Union. Available at: https://ec.europa.eu/commission/sites/beta-political/files/joint_report.pdf.
- 2 Chadha, Jagjit (2017), 'Friday Flyer: dealing with the budget deal', available at: <https://www.niesr.ac.uk/blog/friday-flyer-dealing-budget-deal>.

This box was prepared by Amit Kara.

Box B. Our Brexit assumptions and an alternative 'no-deal' Brexit scenario

The UK's future relationship with the EU remains the single most important risk facing the economy. The Phase I agreement has increased the likelihood of a soft Brexit (Box A), but risks remain. In this Box we specify the assumptions that underpin our central forecast which essentially reflects a soft Brexit scenario. We then contrast these assumptions with an alternative scenario that is based on a more pessimistic outcome where negotiations fail and the UK moves to a WTO-style trading relationship in 2019. Our results show that this would cause a mild recession within one year and real GDP per head would be some £2,000 lower relative to our soft Brexit after a decade. To be sure, the alternative 'no-deal' scenario assumes that the UK will not reach new trade deals with other countries or regions and to that extent this estimate may be too pessimistic in the longer run.

The Phase I agreement drew attention to an important constraint relating to the future trading relationship between the UK and the EU. Both sides have expressed a political desire to maintain a free and open border between the Republic and Northern Ireland and the UK is determined to keep intact the free and open border between Northern Ireland and the rest of the UK. This, together with the Prime Minister's well established position that the UK is looking for a trade relationship that is as deep and broad as the European Economic Area, increases the likelihood of a soft Brexit. In our view this will come at a cost – we have assumed that the UK will make budgetary contributions to the EU and also accept a degree of labour mobility (Box C). More specifically, we make the following assumptions in our central forecast and the alternative WTO-scenario.

- **UK exports:** In our soft Brexit central case the UK maintains a close but not complete trading relationship with the EU. That less comprehensive relationship is reflected by negative residuals to the export and import volume equations. In the alternative scenario the UK exits the EU without transitioning into a new free trade relationship with the EU and reverts to trading under WTO rules. This would mean that immediately after exit, some services could no longer be exported to the rest of the EU, e.g. financial services that require passporting rights. Over time, trade in goods and services between the EU and UK would decline as businesses develop new trading relationships. Based on estimates reported by Ebell (2016), we assume that this would reduce trade between the EU and the UK by up to 60 per cent in the long run.
- **Business investment:** The reduction in trade and increase in uncertainty will likely weigh down investment spending by UK-based firms and also foreign direct investment. In our central forecast, we expect business investment to grow by just 2-3 per cent on average over the next five years. By contrast, foreign direct investment in particular is likely to be severely hit under a WTO scenario. HM Treasury (2016) and Dhingra et al. (2017) estimate a reduction of 22 to 24 per cent for such a scenario. We consider a shock to FDI of this magnitude in our 'no-deal' Brexit variant.
- **Migration:** The ONS has revised its population projections. The principal projections show a slightly higher starting point in 2016, but a slower growth rate thereafter so that in 2026 the population is some 0.6 million lower compared to its previous projections. One important reason is lower net migration, but the ONS does not make any Brexit-specific assumptions in this forecast and as such the risks to net migration are skewed to the downside. A harder Brexit than assumed in our baseline could imply that legal barriers are put in place to reduce migration from the EU. It might also make the UK a less attractive destination for workers from the rest of the world. In our alternative scenario, we therefore consider a reduction in net migration of around 100,000 per year relative to the principal projection, corresponding to the ONS's 'low migration' variant.
- **Productivity:** The smaller degree of competition due to lower trade volumes, less investment and a reduction in skilled migration would almost certainly drive productivity lower. We have not explicitly introduced a Brexit-related productivity shock into our base forecast. In the alternative 'no-deal' scenario, however, we consider a gradual reduction in labour productivity which accumulates to a loss of 3 per cent over the course of a decade.
- **Fiscal:** According to the UK government, applying the methodology set out in the Phase I agreement implies a financial settlement with the EU of £35-£39 billion. The schedule of payments is yet to be decided although the Phase I agreement makes clear that the UK will not be required to make any payments earlier than if the UK had remained a Member State. We have, as a result, adopted the latest OBR fiscal projections for EU contributions in our central case and assumed that the UK continues to make contributions beyond 2022 as if it were a member of the EU. In our alternative scenario, we assume that the UK honours its commitment to the current EU budget in line with the Phase I agreement. After the budgetary framework ends in 2020, we assume that annual net contributions to the EU do not fall to zero but reduce by one half as outstanding liabilities will need to be paid and the UK may decide to continue being part of initiatives such as Horizon 2020, for which contributions will be due (see also Box A).

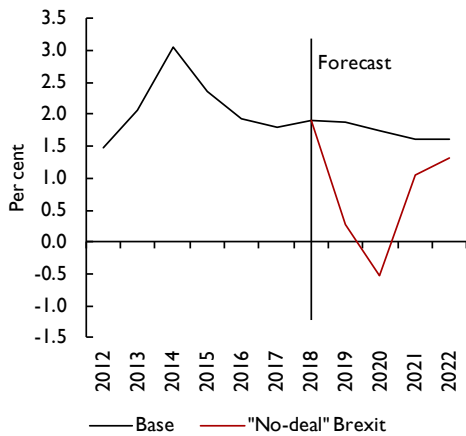
Figure B1 plots the growth rate of real GDP in a 'no-deal' Brexit scenario that unfolds in the first half of 2019. The impact is measured relative to our baseline forecast. In this scenario, we expect the economy to enter a recession within one year. Output growth would stall as the introduction of trade barriers would lead to an immediate reduction in exports to the EU, in particular of services. The fall in exports would only be moderated somewhat by a depreciation of sterling, which cheapens goods and services exported to the EU and the rest of the world but raises the price of imported goods. We would expect the rise in import prices to feed into consumer prices which would add 1.3 percentage points to inflation (Figure B2), dampening domestic demand. Over time, the growth rate of

Box B. (continued)

real GDP would settle at a lower rate than assumed in our central forecast as net migration falls and the productive capacity grows at a slower pace.

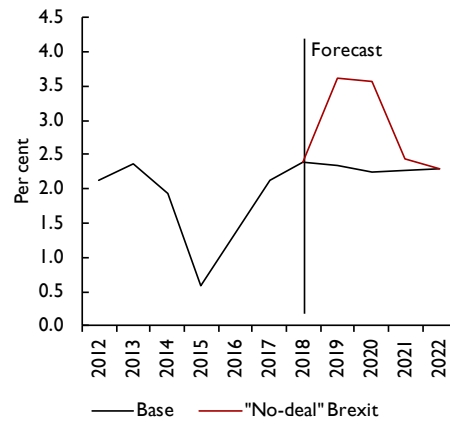
The welfare effects of a ‘no-deal’ Brexit scenario in the long-term are plotted in figure B3. It shows that within a decade, a collapse in trade negotiations and a failure to substantially replace existing trade deals could lead to an annual loss in real GDP per capita of up to £2,000, or close to 6 per cent, relative to the baseline. A large part of this loss is explained by the reduction in trade (light red areas), which highlights the importance of a comprehensive trade agreement with the EU for the welfare of the country. The productivity implications from a ‘no-deal’ Brexit also constitute a substantial cost to the economy, in particular over time (grey areas). The direct effects of foreign direct investment further reduce output per head while effects from a slowdown in net migration are negligible given that future economic output would be shared with a smaller number of people, compared to our forecast base. Finally, repatriating some of the contributions currently made to the EU budget would stimulate the economy in the short run, but only at the margin and without substantial long-term implications.

Figure B1. Baseline real GDP growth and ‘no-deal’ Brexit variant



Source: NiGEM simulation.

Figure B2. Baseline rate of inflation and ‘no-deal’ Brexit variant



Source: NiGEM simulation.

NOTES

- 1 Ebell (2016) estimates that moving from an EEA-type of trading relationship to a WTO scenario reduces bilateral goods trade by 58 to 65 per cent and services trade by 61 to 65 per cent.
- 2 Ebell et al. (2016) estimate that a permanent 5 per cent fall in labour productivity in NiGEM causes GDP to fall by 5.1 per cent relative to a no Brexit baseline scenario. Other studies suggest that a 20 per cent reduction in trade tends to reduce productivity by 5 per cent in the long run (e.g. Feyrer, 2009).

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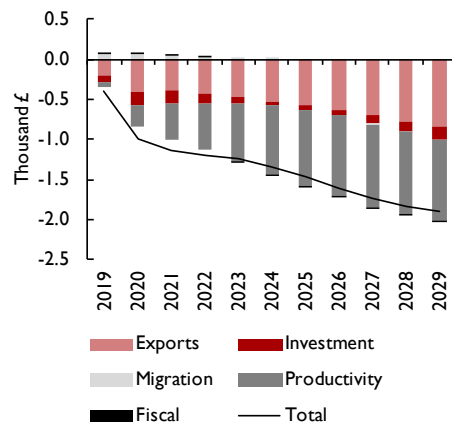
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Figure B3. ‘No-deal’ Brexit variant: reduction in real GDP per capita relative to base



Source: NiGEM simulation.

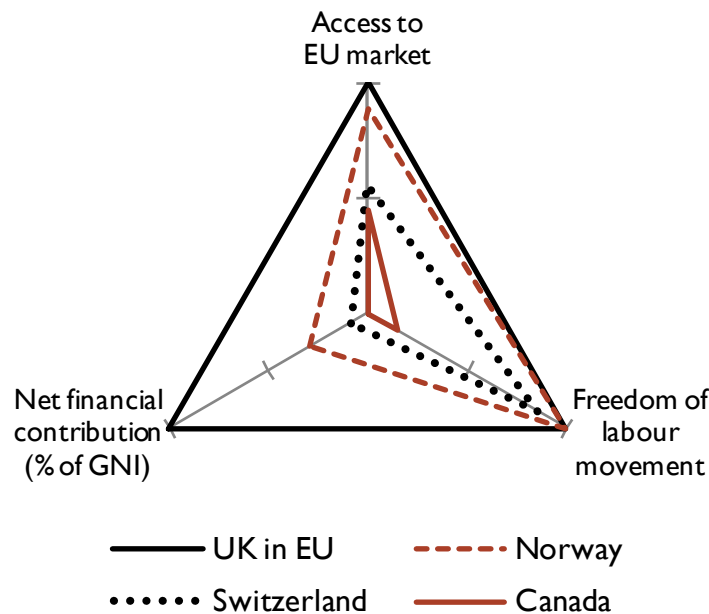
Box C. The great British trade-off

Following the successful completion of the first phase of the Brexit negotiations in early December (Box A), the focus has turned to the Withdrawal Agreement which will help define the future relationship between the European Union and the United Kingdom. In this box, we compare the UK government’s objectives with existing agreements that the EU achieved with Canada, Norway and Switzerland. In our view the UK can achieve an ambitious deal with the EU, but that will require important concessions.

In the Brexit White Paper (HM Govt, 2017), the UK government stated that it aimed to achieve the “freest and most frictionless” trade possible in goods and services between the UK and the EU while putting an end to both the freedom of movement of labour between the UK and the EU and the jurisdiction of the Court of Justice of the European Union (CJEU) in the UK. The EU on the other hand said that while it welcomed a “close partnership” (European Council, 2017) its paramount objective was to preserve the integrity and attractiveness of the single market and its four related freedoms: free movement of goods, capital, services and persons (“no cherry picking”). The EU also made clear that the future partnership would have to be consistent with existing and future trade arrangements between the EU and third parties.

There are a number of dimensions by which one can define the new relationship. We have distilled these into three key areas: market access is a quantitative measure of the level of access of companies to the EU internal market, budgetary contribution is the net financial contribution to the EU budget, per GNI, and freedom of labour movement measures how easy it is for citizens of one country to establish themselves in the partner country. Figure CI is a visual representation of the trade-off for a handful of relationships between the EU and non-EU countries where the vertices of the triangle correspond to full market access, complete freedom of movement of people and size of the financial contribution (as a percentage of GNI).

Figure CI. The EU market access trade-off triangle



Source: European Commission, World Bank, NIESR.

Depending on the type and depth of trade agreement signed with the EU, different countries in the world have more or less access to the EU internal market. To measure the level of access, we use the World Bank database of preferential trade agreement (Hofmann *et al.*, 2017), which classifies the content of trade agreements into 52 standardised provisions according to a methodology developed by Horn *et al.* (2010). These include, for example, reduction in tariffs for industrial goods, reduction in technical barriers to trade and opening up of public procurement contracts. Our metrics of access to the EU market is the sum of provisions weighted by a factor 3 if a provision is legally enforceable with a formal dispute settlement mechanism, 2 if a provision is legally enforceable but without a dispute settlement mechanism or 1 if it is not legally enforceable. Having a dispute settlement mechanism in place provides more certainty for companies and therefore it is considered an important factor of the

Box C. (continued)

depth of a trading agreement. EU member states get the highest score of 130 and Norway, which is a founding member of the European Economic Area, gets a score of 120. We extend the database to include both the Comprehensive Economic and Trade Agreement (CETA) between the EU and Canada that entered into force in 2017 and the bilateral agreements between Switzerland and the EU, using our best judgement for each provision. These two relationships are not covered in the World Bank database. Switzerland has less market access to the EU compared with the EEA countries and CETA is less ambitious than the bilateral trade agreement with Switzerland mainly because the services sector is excluded. Figure C2 shows the level of market access for the most ambitious trade agreements that the EU has signed to date.

The functioning and deepening of the EU internal market requires contributions to the EU budget from every member state. The EU then redistributes those funds, generally from richer to poorer countries, resulting in rich countries like the UK being net contributors. We measure those contributions using the net budgetary contribution per GNI for the year 2015. Non-EU countries that wish to be integrated into the internal market are also expected to make some contributions to the EU budget via participation in one or several of the EU's programmes. The net contributions of Norway and Switzerland were in 2015 respectively 0.14 and 0.01 per cent of GNI, which is much lower than the 0.46 per cent that the UK contributed as a full member of the EU, even taking into account the rebate the UK has benefited from since 1985. Countries like Canada that have signed a free trade agreement with the EU don't make any contribution but of course they also have a lower level of access than EU countries.

A key but sometimes contentious feature of the single market is the freedom of citizens to go and work in any other member country without restriction. In order to have a large access to the EU market in goods and some services, the EU insisted in 1999 that Switzerland agree to the free movement

of persons. While the Swiss electorate subsequently voted in favour of extending the free movement of persons from the countries that joined the EU, it voted in 2014 to put back restrictions on immigration. In 2017, a new law to give preference to nationals in the job market was voted for, but this has yet to be approved by the EU as it would be in breach of the Swiss-EU bilateral agreement. CETA also has a provision to facilitate the movement of labour, but this is much less ambitious and generally limited in time.

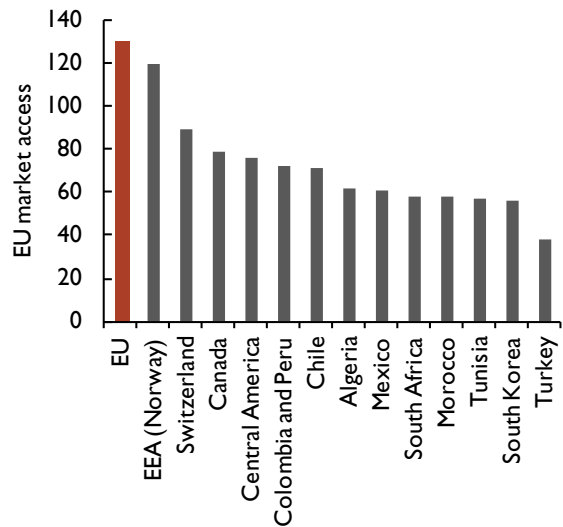
The EU has negotiated a wide range of trading relationships with non-EU countries and as such there is room for a new relationship with the UK that embodies free and frictionless trade. But the position of the UK government to end the free movement of persons and the jurisdiction of the CJEU makes that objective more difficult to attain because it will most likely push the UK out of the single market after the transition period. This means that the new UK triangle in figure C1 will be constrained to be inside the Norway triangle, with a lower market access than currently enjoyed by members of the single market and the UK itself. To maintain a higher market access than Switzerland, which faces restrictions on some services and the financial sector in particular, the UK will probably have to continue contributing to the EU budget and accept some degree of free movement of labour. In that sense, the UK will not be able to "have its cake and eat it". The EU expects the negotiation to be completed by November 2018.

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Figure C2. Level of market access for trade agreements signed with the EU



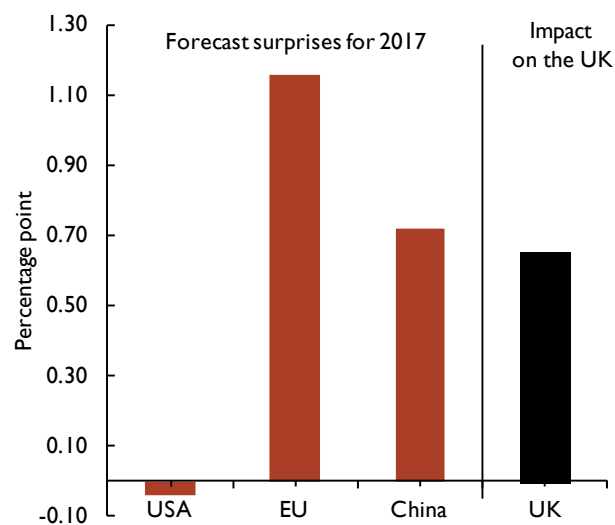
Source: World Bank, NIESR.

appreciation of the currency. The trade-weighted exchange rate has appreciated by around 2 per cent since our last forecast but even after this appreciation sterling is still some 20 per cent below its 2015 peak. The UK economy will rebalance away from domestic demand and towards international trade in response to a favourable international growth backdrop and the weaker currency.

Looking back, it is clear that the economy has outperformed many forecasts. Take our August 2016 forecast, which was the first quarterly forecast after the EU referendum. We, along with the Bank of England and many others, envisaged a material slowdown in GDP growth in the second half of 2016 and in 2017 in response to the expected effects of greater uncertainty and tighter credit conditions. As it turns out, GDP growth eased in the first half of 2017 before nudging higher in the second half, such that growth for 2017 overall was broadly unchanged from the previous year at 1.8 per cent according to official data, around 0.8 percentage points higher than we had envisaged in August 2016.

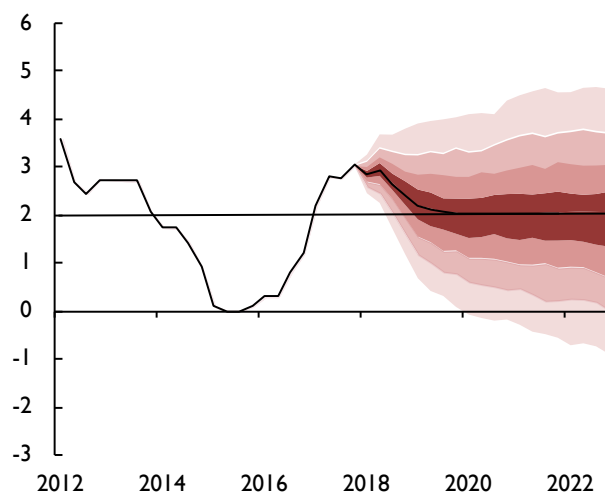
There are a number of factors that account for the better-than-expected outcome. Of these, the most important is the upside surprise to global growth since August 2016.

Figure 3. Real GDP growth surprises and the impact on UK GDP (compared with August 2016 forecast)



Source: NIESR.
 Note: Forecast surprises are the difference between our August 2016 forecast for 2017 real GDP growth and current estimates. The impact on the UK is estimated as the difference between our August 2016 forecast for 2017 and a hypothetical forecast accounting for forecast surprises in the rest of the world.

Figure 4. CPI inflation rate fan chart (per cent per annum)



Source: NiGEM database, NIESR forecast and NiGEM stochastic simulations.
 Notes: Each bound represents a cumulative decile of the probability distribution around the February 2018 forecast. The Bank of England's inflation target is 2 per cent per annum.

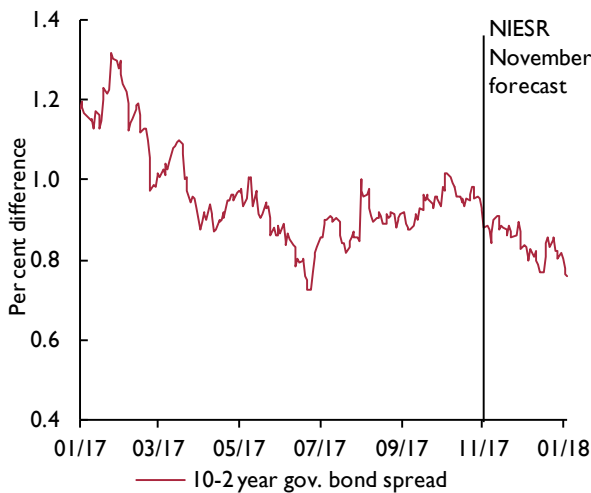
With the exception of the US, economic growth in most countries that are closely linked to the UK economy surprised to the upside.

All things equal, our UK GDP growth forecast would have been some 0.6 percentage point higher in 2017 if we had perfect foresight of the global landscape at the time of the August 2016 forecast (figure 3). Put differently, around 0.6 percentage point of the difference between our 1 per cent forecast and the outcome of 1.8 per cent can be accounted for by stronger global growth than had appeared likely at the time. Alternatively, had global growth remained close to the very weak forecast that we had in August 2016, UK economic growth would have been 1.2 per cent in 2017 instead of 1.8 per cent.

CPI inflation touched 3.1 per cent in November, thereby triggering an explanatory letter from the Governor to the Chancellor. We expect inflation to ease from here towards the target rate of 2 per cent by the second half of 2019, broadly in line with our previous forecast (figure 4).

With inflation high but easing towards its target, economic growth broadly in line with potential, employment and unemployment at record levels, there is a case for the MPC to remain on a gentle path of normalisation by increasing Bank Rate gradually and to a limited extent (Chadha, 2017). We expect the Bank

Figure 5. 10–2-year government bond spread



Source: Datastream, author's calculations.

of England to raise Bank Rate once again in May and every six months after that until Bank Rate reaches 2 per cent in mid-2021. The yield curve, as measured by the difference between the 2-year and 10-year government bond yield, has flattened since our last forecast (figure 5). The 10-year bond yield has been fairly stable at around 1.3 per cent, but the 2-year rate has nudged higher as market participants expect the policy rate to rise further.

Risks to our forecasts

Overall, the risks to our economic growth and inflation forecasts are judged to be balanced. The Institute’s global macroeconomic model, NiGEM, is able to produce stochastic forecasts based on the historical distribution of forecast errors (figure 2 for GDP growth and figure 4 for CPI inflation). That balanced outlook stems from two countervailing underlying assumptions – our future relationship with the EU and the prospects for productivity growth. We can benchmark our forecast against the WBS statistical model combination approach (Box D). For 2018, risks to our forecast of GDP growth and WBS’s forecast are balanced, whilst, moving into 2019, WBS’s data-driven risk assessment is somewhat more skewed to the upside.

As discussed above, the soft Brexit scenario that underpins our central forecast will breach a number of red lines drawn by UK politicians, particularly those that are in favour of Brexit, thus leaving open the prospect of failed negotiations, political turbulence and also the possibility of a general election and a second referendum.

In other words, the UK economy will operate under a cloud of political and economic uncertainty that is consistent with a wide spectrum of outcomes ranging from a WTO-based relationship at one end to another referendum that reverses the Brexit vote of 2016 at the other.

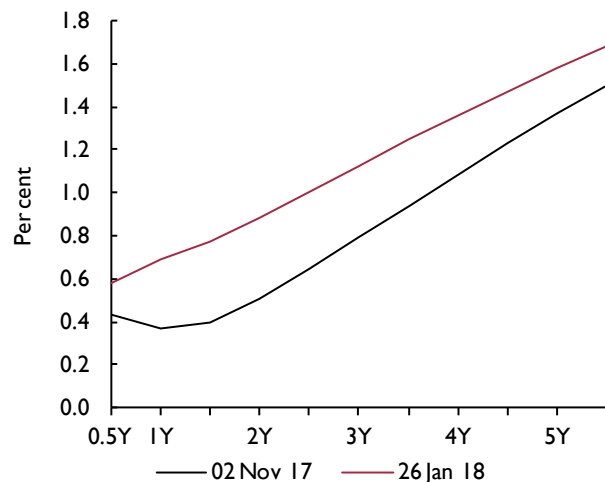
In our view, the risk of failed talks is higher than the risk of a second referendum that reverses the result – failure that would then lead to a trading relationship under WTO rules that would be costly for the UK economy. The sudden loss in market share combined with a lower exchange rate would drive inflation higher and the economy into recession in the short term. Longer-term growth prospects would also be damaged because of the impact on productivity (see Box B).

Our supply side judgement on productivity growth, net migration and the overall speed limit of the economy are also important risk factors, but the risk to real GDP from these is tilted to the upside. In the central case, labour productivity growth recovers gradually from 0.5 per cent in 2017 to 1¼ per cent per annum over the next two years, which is well below the average over the decade prior to the financial crisis. A more rapid reversion to around 2.2 per cent presents an upside risk to our real GDP growth forecast and a downside risk to the short-term inflation and Bank Rate profiles.

Monetary policy

The Bank of England raised Bank Rate in November from 25 basis points to 50 basis points, the first increase

Figure 6. UK instantaneous nominal forward curve



Source: Bank of England.

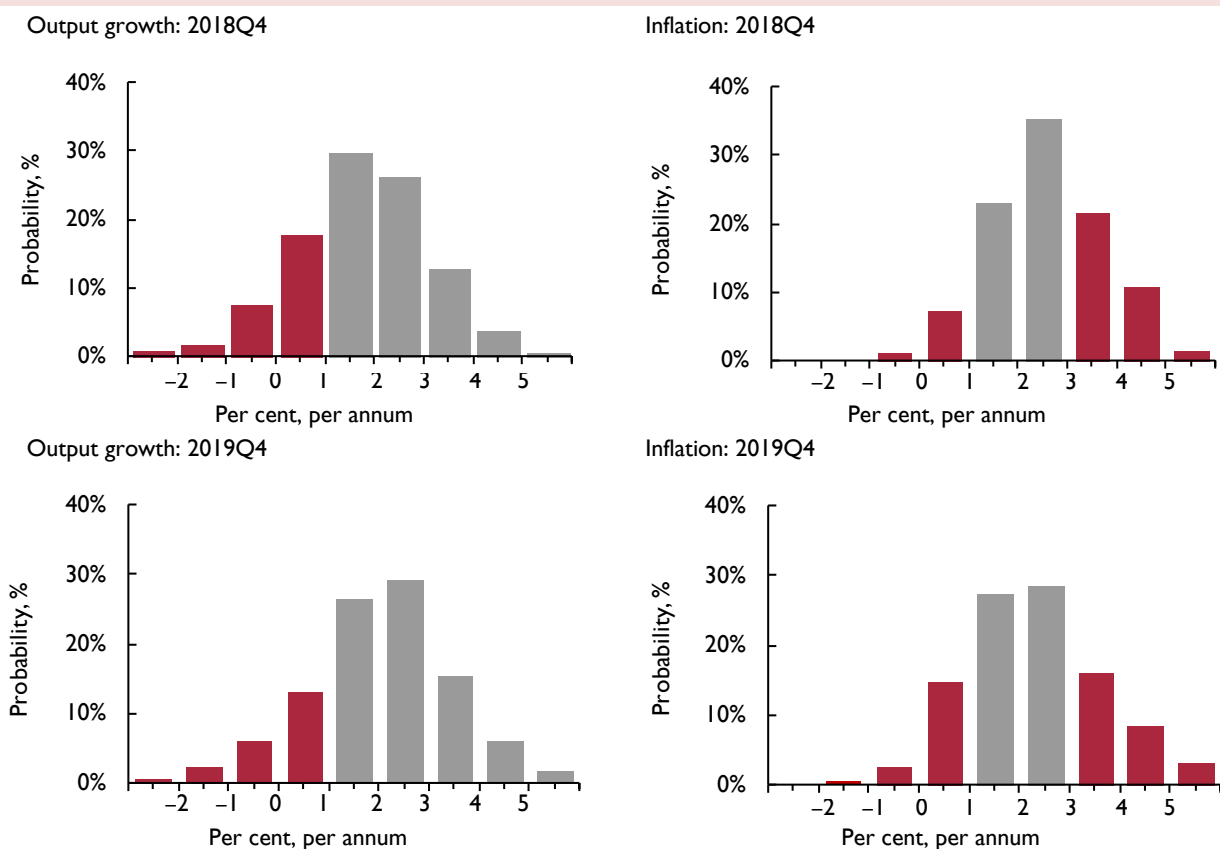
Box D. Forecasting with a benchmark: the Warwick Business School forecasting system

We provide benchmark forecasts to help understand and contextualise the forecasts presented in this Review. The box presents density forecasts for UK GDP annual growth and inflation, and reports the probabilities of a range of output and inflation events occurring, as calculated using the Warwick Business School Forecasting System (WBSFS).

To reflect the uncertainties inherent in economic forecasting, and following the practice of NIESR and other forecasters such as the Bank of England and OBR, the WBSFS provides probabilistic forecasts. The WBSFS forecasts are produced by explicitly combining density forecasts from a set of 24, statistically motivated, univariate and multivariate econometric models commonly used in the academic literature. The use of combination forecasts or model averaging reflects the view, supported by research (e.g., see Bates and Granger, 1969; Wallis, 2011; Geweke and Amisano, 2012; Rossi, 2013), that because any single model may be mis-specified there may be gains from the use of combination forecasts.

Comparisons of the Institute’s forecasts with the probabilistic forecasts from the WBSFS may be interpreted as providing an approximate indicator of the importance of expert judgement, which may include views on the underlying structure of the macroeconomy. This is because the WBSFS forecasts are computed by exploiting regularities in past data with the aid of automated time-series models; they do not take an explicit, structural or theoretical view about how the macroeconomy works; and they do not rely on (subjective) expert judgement to the same degree as those presented by the Institute. The forecasts from the WBSFS are not altered once produced; they are deemed ‘simply’ to represent the data’s view of what will happen to the macroeconomy in the future.

Figure DI. WBSFS forecast probabilities for real GDP growth and inflation, year-on-year



Note: To aid visualisation, output growth forecast outcomes greater than 1 per cent are coloured grey, red otherwise. For inflation, grey outcomes are defined as inflation within the Bank of England’s target range of 1–3 per cent, such that the Governor does not have to write a letter of explanation to the Chancellor; forecast outcomes outside the target range are coloured red.

Box D. (continued)

Figure D1 presents WBSFS's latest (as of 16 January 2018) probabilistic forecasts for real GDP growth and inflation – defined as year-on-year growth rates for 2018Q4 and 2019Q4 – as histograms. The information set used to produce these forecasts includes information on GDP growth up to 2017Q3 and the latest CPI inflation estimate for December 2017.

Table D1 extracts from these histogram forecasts the probabilities of specific output growth and inflation events. The events considered are the probability of output growth being less than 0 per cent, 1 per cent and 2 per cent, and of inflation lying outside the 1–3 per cent target range (i.e., the probability of the Bank of England's Governor having to write a letter explaining how and why inflation has breached its target range). Also reported are the individual probabilities of inflation being less than 1 per cent and greater than 3 per cent, to indicate which side of the target range is most likely to be breached.

Inspection of the forecasts for output growth for 2018Q4 in table D1 suggests that, compared with our forecasts made one quarter ago, relatively little has changed. The most likely range for the forecast remains for economic growth between 1 and 2 per cent in 2018Q4. But looking out further to 2019Q4, growth between 2 and 3 per cent is most likely. But the differences between the growth forecasts for 2018Q4 and 2019Q4 look less material when we inspect the histograms as a whole. As table D1 shows, the difference between the forecasts for 2018Q4 and 2019Q4 is explained by modest downward revisions to the risk of 'low' growth (growth less than 1 per cent); the probability event forecasts have fallen from 26 per cent for 2018Q4 to 21 per cent for 2019Q4.

Table D1. Probability event forecasts for 2018Q4 and 2019Q4 annualised % real GDP growth and CPI inflation (extracted from the WBSFS forecast histograms)

| Year | Real GDP growth (% p.a.) | | | CPI inflation (% p.a.) | | |
|-------------------------------|--------------------------|-----------------|-----------------|------------------------|--------------|--------------|
| | Prob(growth<0%) | Prob(growth<1%) | Prob(growth<2%) | Prob(letter) | Prob(CPI<1%) | Prob(CPI>3%) |
| 2018Q4 | 9% | 27% | 56% | 42% | 8% | 33% |
| 2018Q4 (previous forecast) | 10% | 26% | 55% | 40% | 11% | 29% |
| 2019Q4 | 8% | 21% | 48% | 44% | 17% | 27% |

Similarly, for inflation, our forecasts are little changed relative to those made in this Review one quarter ago. An inflation rate between 2 and 3 per cent is the most likely outcome in the year ending 2018Q4, with a 35 per cent probability (previously it was 37 per cent). But the WBSFS predicts that inflationary pressures dissipate somewhat in 2019Q4, with an approximately equal probability (around 27–28 per cent) of inflation falling in the 1–2 per cent and 2–3 per cent ranges. As downside risks to inflation also increase over time, the probability of inflation falling in the 1 to 3 per cent target range, in fact, shows a small decrease from 58 per cent, in 2018Q4, to 56 per cent in 2019Q4. One quarter ago the WBSFS predicted a similar probability, 60 per cent, of inflation falling in its target range in 2018Q4; and so the implication drawn is that the lower inflation estimate for December 2017 has only led to a small downward revision to the inflation forecasts.

NOTE

1 WBSFS forecasts for UK output growth and inflation have been released every quarter since November 2014. Details of the releases are available at <https://www2.warwick.ac.uk/fac/soc/wbs/subjects/emf/forecasting/> and a description of the models in the system and of the indicators employed is available at https://www2.warwick.ac.uk/fac/soc/wbs/subjects/emf/forecasting/summary_of_wbs_forecastng_system.pdf.

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This box was prepared by Ana Galvão, Anthony Garratt and James Mitchell.

in the policy rate for more than ten years, and at the same time also signalled the need for gradual normalisation of the monetary policy stance. Financial markets reflect this view and have brought forward their expectations of a tightening of monetary policy, see figure 6. We maintain our recommendation for another 25-basis point increase in May, and every six months after that until Bank Rate reaches 2 per cent in mid-2021. This is set against a backdrop of robust global output growth, steady UK growth and above target inflation for another two years.

The MPC has long stated that it will continue to reinvest the proceeds from maturing bonds bought under its Asset Purchase Facility until the policy rate reaches the threshold of 2 per cent. That guidance has not changed and we would expect the Bank's balance sheet to shrink from mid-2021 as bonds mature, given that on our forecast the threshold is reached at that point. We assume that the bank will not actively sell bonds back to the market.

Risks to monetary policy

Brexit is a key risk for the economy and monetary policy, and the risks are to either side of our underlying soft Brexit assumption. In Box B we present the impact of a scenario in which negotiations fail and the UK enters into a WTO-based trading relationship with the EU in 2019. In this simulation, the currency depreciates and inflationary pressures mount in response.

A standard monetary policy reaction function, such as the Taylor Rule, would prescribe tighter monetary policy. The MPC responded differently in 2016, after the Brexit referendum, choosing to look through the first round effect of the exchange rate depreciation onto prices. Primarily, this was driven by the increased uncertainty associated with the outcome of the referendum and its likely drag on output. In fact, the MPC injected additional stimulus into the economy to support economic growth and introduced measures to stabilise the financial sector.

The response may be different this time under the alternative 'no-deal' scenario, the main reason for which is the current elevated level of inflation and the nature of the trade-off the MPC faces.¹ In 2016, CPI inflation was below 1 per cent, but inflation is forecast to be above 2 per cent this year and set to remain in excess of the target for most of the 2–3 year horizon over which monetary policy conventionally operates. An additional rise in inflation may lead to a tighter monetary policy stance.

There are other domestic risks to monetary policy. Of these, the most proximate is the outlook for wages as

we enter the wage settlements season. Indications from surveys, such as XpertHR, suggest that settlements will remain subdued at a level that is broadly consistent with the inflation target, but pressures may emerge. To start with, the 1 per cent cap on public sector pay, that has been in place since 2010, will be lifted in 2018–19. A rapid convergence to private sector levels that is not accompanied by gains in productivity will raise inflationary pressures (Box D in the UK chapter of the November 2017 *Review*). Separately, the National Living Wage is rising faster than productivity growth. Any material spillover from this into the next rung of wages, or wages more broadly, could lead to further inflationary pressure.

We revised lower our forecast for whole economy productivity growth in November in response to a decade of disappointing outturns. Labour productivity, as measured by output per hour worked, is set to recover to an annual growth rate of just above 1 per cent over the forecast horizon, compared with an average of around 2 per cent in the ten years leading up to the financial crisis that started in 2007. All things equal, a quicker return to the pre-crisis average would require a lower policy rate in the short term to lift growth to its potential.

Another risk is the global outlook. World economic growth is thought to have picked up to 3.7 per cent last year – the fastest pace since 2011. This recovery has been broad-based and our forecasts suggest that most countries will continue to enjoy a healthy rate of economic growth in 2018 and 2019. The risks to that outlook are thought to be symmetric (see *The World Economy* chapter in this *Review* for more details) and stronger global growth is likely to be associated with higher inflationary pressure.

Prices and earnings

Prices

Our central forecast is for CPI inflation to have peaked in the final quarter of 2017 and then ease back to the target rate of 2 per cent in early 2020 as the impact of the currency depreciation fades (figure 4). This view has not changed materially since November. The risks to that forecast are balanced assuming that the UK achieves the soft Brexit scenario outlined earlier. Should talks fail and the UK trade under WTO rules, inflation would again rise above 3 per cent (see Box B).

The 12-month CPI inflation rate fell from 3.1 per cent in November to 3 per cent in December. All major components of the goods and services basket contributed

to the level of inflation. Increases in alcoholic beverages and tobacco prices were particularly important, reflecting the increases in duties announced in the Autumn Budget. The biggest contribution, however, came from rising transport prices. The cost of transport, as an energy-intensive activity, partly reflects oil prices, which increased by roughly £10 a barrel in the second half of 2017. Based on the simulation in Box A in the *World Economy* chapter, an oil price shock of this magnitude leads to a peak impact on UK inflation of approximately 0.2 percentage points after a year.

Earnings

Earnings growth, however, has persistently fallen short of consumer price inflation. Average weekly nominal earnings in Great Britain, for example, were 2.5 per cent higher including bonuses and 2.4 per cent excluding bonuses between September and November than in the same period a year before. Settlements data, on the other hand, point to a wider gap. According to XpertHR, the whole economy median increase in basic pay remained flat at 2 per cent in every month in 2017.

The wedge between consumer price inflation and nominal earnings growth has pushed real wages down. Based on the CPIH, the ONS's preferred earnings deflator which includes owner occupiers' housing costs, real average weekly earnings fell by 0.2 per cent including bonuses and 0.5 per cent excluding bonuses in November compared to the previous year. This marks the eleventh straight month in 2017 that real regular pay decreased. What is more, real wages are more than 6 per cent below the 2008 peak.

The sluggishness of wage growth is puzzling against a backdrop of diminishing slack in the labour market. The latest figures from Bell and Blanchflower's article in this *Review* (pp. 53–61) show that underemployment has fallen significantly. In addition, the recent Bank of England *Agents' Summary of Business Conditions* documented the most severe recruitment difficulties since 2004. In a recent speech, MPC member Michael Saunders shows that this is not only a UK phenomenon but is also affecting EU and A8 countries, meaning that it is unlikely that these labour challenges can be solved through higher net inflows of foreign workers or outsourcing, but would probably need to be met by rising productivity otherwise the central bank will be forced to tighten monetary policy (Saunders, 2018).

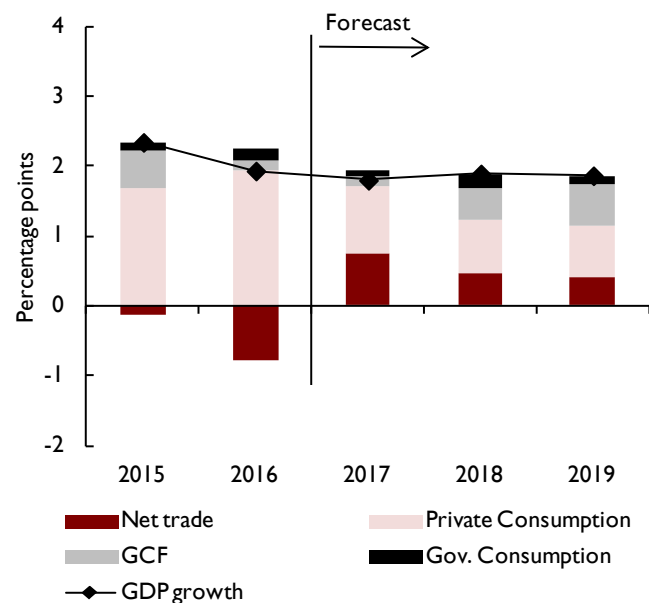
All in all, we expect nominal wages to rise by more than inflation throughout the forecast horizon, meaning higher real wages. We forecast that the growth in

real wages will be relatively modest in 2018 but with increases approaching 1 per cent per annum thereafter. The improvement of real wage growth is linked to a mild recovery in productivity growth to slightly above 1 per cent per year throughout the forecast horizon, as discussed below in the medium term section.

Risks

There are, however, a number of risks to the inflation forecast and, assuming that the UK manages to achieve a soft Brexit, these risks are thought to be balanced. First, according to the Bank of England *Inflation Attitudes Survey*, inflation expectations are edging upwards, which could feed through into higher-than-expected inflation if the trend continues. Second, if the UK were to follow WTO trade rules after leaving the European Union, this would tend to raise import prices and pass through to higher consumer prices. Third, spillovers from higher public sector wages or from increases in the National Living Wage could lead to nominal earnings growth and inflation in excess of our forecast. According to the Office for Budget Responsibility (OBR), the National Living Wage, for example, is expected to increase over the next five years at an average rate of 4 per cent and apply to a growing body of the labour force. Lastly, should productivity growth surprise on the upside, this would lower our inflation forecast.

Figure 7. Contributions to GDP growth



Source: NiGEM database and NIESR forecast.

Notes: GCF stands for gross capital formation. Expenditure components for 2017 are not yet available.

Components of demand

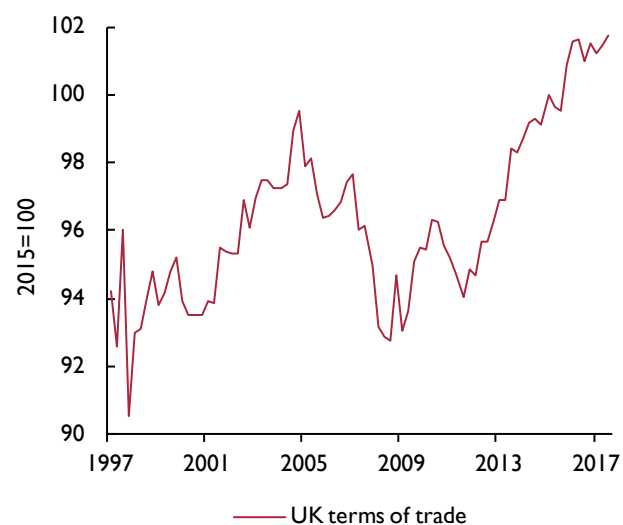
We have revised higher our forecast of real GDP growth by around a quarter of a percentage point to a little under 2 per cent for this year and next. The main reason for this upward revision is stronger global growth and also a less uncertain outlook for domestic demand following the breakthrough of the Phase 1 Brexit agreement in December. We have assumed in this forecast a ‘soft Brexit’ where the UK maintains a very high level of access to the single market.

Net trade strengthens

The UK economy is rebalancing. Net trade is estimated to have added some 0.7 percentage points to GDP growth last year, the first positive contribution since 2011. Looking ahead, we see the external sector continue to make a positive contribution this year and next year and, should that happen, this will be the first time in ten years that net trade makes a positive contribution for three consecutive years (figure 7).

One important reason for the strength in net trade is the weaker currency. The effective exchange rate remains around 20 per cent below its 2015 peak, even after taking into account the recent appreciation. In addition, growth in the rest of the world and especially the Euro Area has surprised on the upside. The Euro Area economy expanded by 2.5 per cent in 2017, the fastest rate since 2006, and we now expect it to grow at an average of 2.2 per cent this year, up from a forecast of 1.9 per cent in November. As a result, UK exports are estimated to have

Figure 9. UK terms of trade

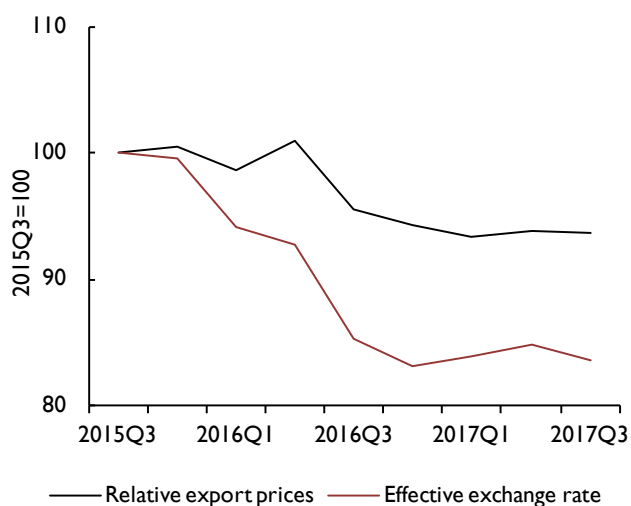


Source: NiGEM database and NIESR forecasts.

grown by around 6 per cent in 2017, the fastest rate for almost a decade. The growth of exports is expected to decline gradually over the forecast period.

Exporters have not only benefitted from volume growth, they have also taken the opportunity to build up their profit margins. This is clear in figure 8, showing that relative export prices have not changed in line with the decline in sterling. By contrast, import prices tend to be more sensitive to changes to the exchange rate than export prices, helping to push up net trade even more. Taking export and import prices together, the ratio as represented by the terms of trade reached its highest level for more than twenty years.

Figure 8. Exports margins



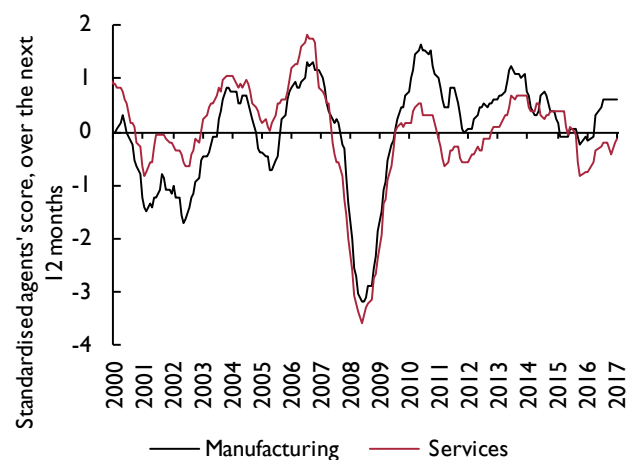
Source: NiGEM database and NIESR forecasts.

Domestic demand weakens

This terms of trade shock has eroded household disposable income through higher prices. Over the past two years real personal income has grown at an average of just 0.2 per cent per annum. Consumers have looked to maintain spending levels by saving less and, as a result, the household saving ratio fell to just 4 per cent in the first quarter of 2017, before recovering to 5.4 per cent in the third quarter.

Private consumption is expected to remain weak not only because the squeeze in household income persists but also because we expect households to rebuild savings. Consumption makes a positive contribution to GDP growth but the contribution is well below its long-term average.

Figure 10. Standardised investment intentions



Source: Bank of England.

We expect business investment to grow at a yearly rate of 2–3 per cent over the forecast horizon under our baseline scenario of a soft Brexit. Business investment data are notably very volatile, and in addition, Brexit-related uncertainty poses risks to our forecasts. In Box B we simulate the effect of other Brexit scenarios, such as a collapse in negotiations that leads to a WTO-based trading relationship, whereby business investment would be heavily impacted.

The Bank of England's *Agents' Summary of Business Conditions* reports that economic uncertainty represented the main factor negatively affecting investment decisions across most firms. In particular, uncertainty over the future trading arrangement with the EU as well as concerns around the future availability of overseas labour were singled out as significantly reducing firms' planned investment over the next twelve months. Relative to the first half of 2016, when business investment contracted over both quarters, in 2017 it grew by an estimated 2.2 per cent compared to the previous year. Mirroring the hard data, the Bank of England survey of investment intentions picked up in the second quarter of 2017 in both manufacturing and services sectors after falling to a six-year low immediately after the referendum (figure 10).

Finally, our forecasts for government consumption and investment are driven by the official forecasts published by the Office for Budget Responsibility (OBR). We expect real government consumption to add 0.1 to 0.2 percentage points to GDP growth over the next four years, relatively unchanged from our November estimates.

Household sector

Real disposable income has grown by just 0.2 per cent in both 2016 and 2017 extending the period since the financial crisis where disposable income growth has repeatedly surprised to the downside. We see something of a turning point this year as fading inflationary pressures allow households some relief. We forecast real personal disposable income to recover to around 1.5 per cent this year and the risks to that view are tilted to the upside.

Upside risks to wage growth

One important reason for persistently weak real disposable income is disappointing productivity growth. Productivity, as measured by output per hour, strengthens from around 0.5 per cent in 2016 and 2017 to around 1¼ per cent per annum over the next two years. At first glance this might seem to be a fairly aggressive recovery, but productivity and real personal disposable income had been growing by more than 2 per cent in the decade prior to the global financial crisis. As such, the new forecast for productivity continues to point to lacklustre growth by historical standards (see figure A2).

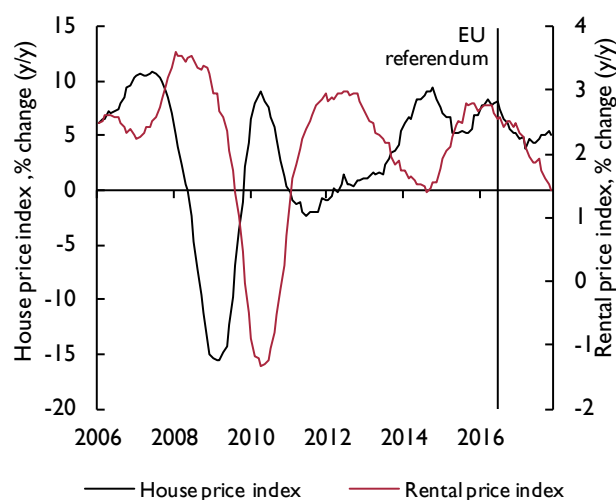
There are other factors that could drive wages higher. Chief among these is the tight labour market with unemployment and underemployment close to record lows. Also, the National Living Wage, which was introduced in April 2016 at £7.20 per hour was raised in 2017 to £7.50 in an attempt to boost real disposable income. It is set to increase to £7.83 in April 2018, and then grow by more than 4 per cent per year to achieve the government's target of 60 per cent of median earnings by 2020. As the number of workers covered by the NLW is expanding, and it is forecast to reach more than 3 million workers by 2020, its impact on real disposable income will be pronounced.

Public sector workers have grown poorer in real terms over the past seven years on average as inflation has outpaced public sector wage growth, which has been capped at 1 per cent since 2010. With inflation recently reaching a five-year high, the government announced that it plans to lift the cap some time over the next two years. That may result in the growth rate of public sector wages converging to that of the private sector in a period of around three years, as estimated by *The Office for Budget Responsibility*. The risk of a lifting of the public sector wage growth cap is of spillovers to the private sector, as discussed further in the 'Public finances' section.

The housing market is cooling off

We base our assumptions on the ONS mix adjusted house price index, which indicates that growth in house

Figure 11. House price and rental inflation



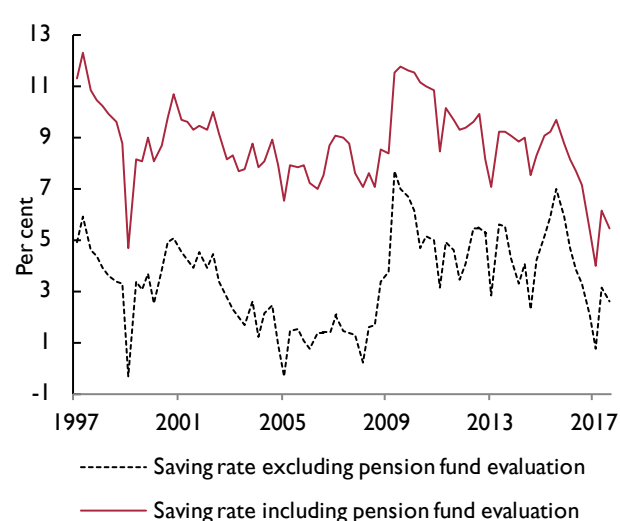
Source: ONS, Thomson Reuters Datastream.

prices has slowed down in 2017, averaging 4.5 per cent compared with around 7 per cent in 2016. This marks a significant cooling of the housing market. There are a number of policy-related measures such as the additional stamp duty on second homes and less generous tax allowance for buy-to-let properties that have contributed to this slowdown. The roll-out of the tax allowance is being phased in, and as such we expect house price inflation to ease further over the next two years. The uncertainty generated by Brexit is also thought to have contributed to the weakness of pockets of the housing market, particularly in London, and that uncertainty is likely to weigh down on the housing market this year. For a discussion on longer-term regional house prices, see the Commentary in this *Review*. It is also worth noting that, historically, there has been a negative relationship between UK rental inflation and house price inflation (figure 11). A collective decision to purchase raises demand and house price increases, while rental prices fall. A collective decision to rent achieves the opposite. Rental inflation has slowed quite dramatically in 2017.

Saving ratio should make a modest rise

The saving ratio including pension fund evaluation averaged around 5.2 per cent in 2017. This low level mirrored the Brexit-driven drop in real disposable income (figure 12). We expect the saving ratio to recover gradually over the forecast horizon, averaging 5.5 per cent and 6.3 per cent in 2018 and 2019 respectively. However, this rate would still be very low relative to its long-run average of 9.4 per cent and also the Euro Area

Figure 12. Household savings ratio



Source: ONS.

average, which was estimated at 12.1 per cent in the first three quarters leading to 2017.

Supply conditions

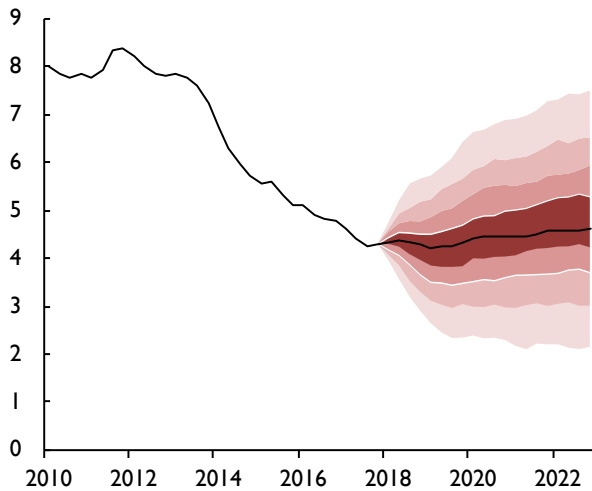
Employment and unemployment

The unemployment rate remained unchanged at 4.3 per cent in the three months to November 2017. However, employment surprised on the upside, rising by 102 thousand persons over the same period, compared to a consensus estimate of a 12 thousand person decrease, and a reduction of 56 thousand persons in the previous three-month period. This extra employment was largely associated with a drop in the number of economically inactive persons of 79 thousand. As a result, the employment rate nudged up to 75.3 per cent which is the joint highest since comparable records started in 1971.

We see employment rising further but the growth rate is set to slow, in part because of the sharp rise in the National Living Wage (NLW) (see Prices and Earnings section above). The NLW is expected to cover around 3 million workers, and possibly more if we consider the potential spillover to the wages of workers earning just above that rate. We expect unemployment to trough at the current level of 4.3 per cent and to rise gradually to 4.6 per cent in 2022 (figure 13).

The ONS vacancy survey indicates that the number of vacancies increased significantly in each quarter of 2017,

Figure 13. Unemployment rate fan chart (per cent of labour force)



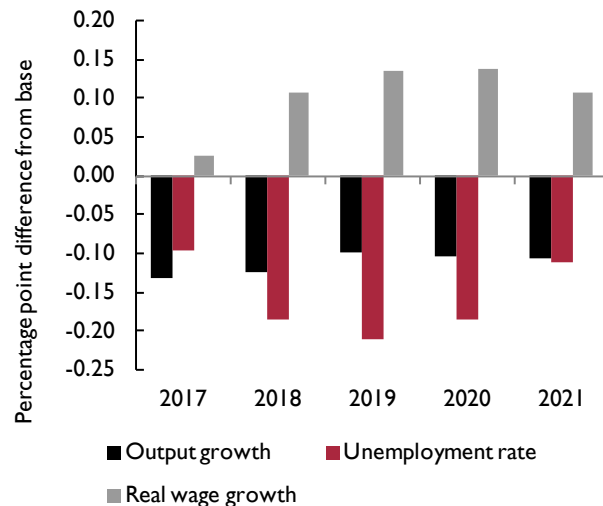
Source: NiGEM database, NIESR forecast and NiGEM stochastic simulations. Note: Each bound represents a cumulative decile of the probability distribution around the February 2018 forecast.

reaching 810 thousand in the final quarter, the highest number since records began using this definition in 2001. Employment intentions, according to the Bank of England’s *Agents’ Summary of Business Conditions*, are indicative of modest increases in recruitment over the coming twelve months. However, recruitment difficulties have intensified over the past year, reaching an all-time high in November 2017, which may make firms’ planned workforce increases difficult to realise and also exert upward pressure on wages.

Earnings

Nominal average weekly earnings (total pay) increased by 2.5 per cent in the three months to November 2017 compared with the same period one year earlier. However, in real terms, weekly total pay decreased by 0.2 per cent over the same period. This lack of real wage growth, despite the apparent tightness of the labour market, remains somewhat of a puzzle. There are a number of potential explanations for the disconnect between wages, prices and unemployment. They include measurement issues where conventional measures of unemployment are thought not to be able to capture the slack in the labour market, well-anchored inflation expectations among workers and employers, improved matching and weak labour productivity. Some economists (Farmer and Nicolò, 2017) have also argued that the relationship between wage growth and unemployment as summarised by the Phillips curve does not exist.

Figure 14. Impact of the new population projections on annual GDP growth and the labour market



Source: NiGEM simulation. Note: Real wage refers to NiGEM variable UKRCWAGE.

Productivity

Labour productivity, in terms of output per hour, increased by 0.9 per cent in the third quarter of 2017 compared to the previous quarter, the largest quarterly increase since 2011. Whole economy output per hour is now 1.1 per cent above its pre-recession peak in the last quarter of 2007. This measure of productivity is quite volatile so we should not assume that this faster growth rate will persist. Additionally, the effect of Brexit on productivity is much debated and crucially depends on the outcome of negotiations between the UK and the EU.

Demographics

Our assumptions for total and working age populations have been revised since the November *Review*, in line with the latest ONS principal projections. We now expect the working age population to be around 300 thousand lower, and the labour force to be around 200 thousand lower each year on average in 2017-2021 and that has implications for our forecast.

Figure 14 shows the effect of these assumed changes on our forecasts for output, unemployment and real wages using NiGEM. In this simulation, interest rates and fiscal policy are unchanged relative to our November forecast over the five-year period. As might be expected, a slower rate of population growth subtracts from output growth and the unemployment rate while real wage growth increases.

Public finances

In his 2017 Autumn Budget, the Chancellor announced a number of spending measures, including additional temporary funding to the NHS and for Brexit preparations, investment in housing, and the lowering of business taxes and stamp duty. The additional spending provides temporary support to the economy but, according to the OBR, will also raise public sector net borrowing by around £4 billion a year over the next four years, relative to the OBR's previous forecast published in March 2017. Fiscal effects from higher spending, however, are overshadowed by the impact of revisions implemented by the OBR relative to its previous economic forecasts including to productivity. These revisions increase the public deficit by more than £10 billion per year over the next four years.

According to the OBR, the overall revision of fiscal deficit forecasts means that budget deficits will remain elevated for longer. This reduces the headroom the government has against its 2020–21 fiscal target (a cyclically adjusted fiscal balance below 2 per cent of GDP) by around a half, or 0.4 percentage points, to 0.7 per cent.

Our central forecast

Our fiscal projections are based on the OBR's taxation and spending plans that were published alongside the Autumn 2017 Budget, while tax receipts, interest payments and the dynamics of the rest of the economy are endogenously determined within our forecasting model. For the current financial year 2017–18, we expect public sector borrowing to reduce to 2.5 per cent of GDP from just below 3 per cent last financial year, which is similar to the OBR forecast. We then expect it to fall below 1 per cent of GDP by 2020–21, which is somewhat faster than the OBR's projections and results from stronger foreign demand effects on our forecast of domestic real output. This is also reflected in our projections of public sector net debt, which, on our central forecast, reaches a level just above 80 per cent of GDP by 2020–21, following a steeper fall than anticipated by the OBR. However, we see three main risks to our fiscal projections.

Spending risks

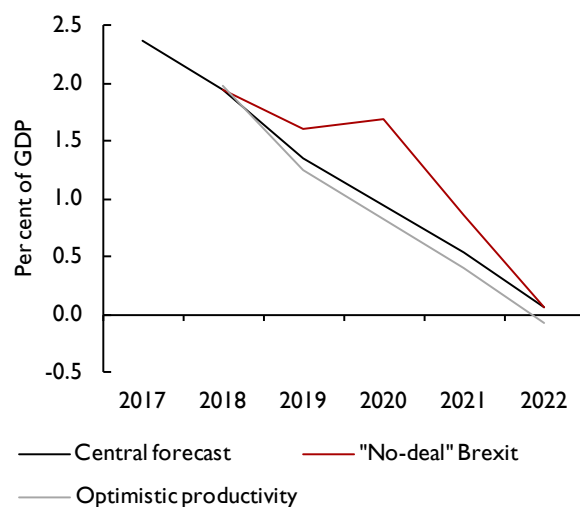
The Chancellor continues to face pressure to raise government expenditure on top of measures included in the last Budget, for instance on the NHS and defence. Recent difficulties faced by public service suppliers Carillion and Capita revealed weaknesses in Private Finance Initiatives. In the future, these may impact public finances in the form of contingent liabilities, for example if the government would have to re-commission or buy out existing contracts. In addition, it has been announced

that public sector pay restraints, put in place in 2010, will be lifted in the pay round process at the beginning of the 2018–19 financial year. The OBR assumes that general government earnings growth will converge on whole economy earnings growth over the next three years, which, in their projections, will be paid for by squeezing non-pay expenditure and reducing public sector employment. However, there is a considerable risk that lifting the public sector pay cap will not be fiscally neutral. There is limited scope to further reduce the public sector workforce, which has been stable at around 5.5 million since 2015 after falling from 6.5 million employees in 2009. In order to maintain the skill set of public sector employees, public sector wages would also have to increase by more than private sector wages to overcome current differences in the level of pay and 'catch up' (Dolton *et al.*, 2018).

Productivity risks

The repeated over-estimation of productivity growth since the Great Recession led us to revise downward the growth rate of labour productivity in our last *Review*. We maintain the assumption of annual labour productivity growth at around 1 per cent in our present base forecast. An unexpected pick-up in productivity growth constitutes an upside risk to our fiscal projections. Figures 15 and 16 illustrate that a more

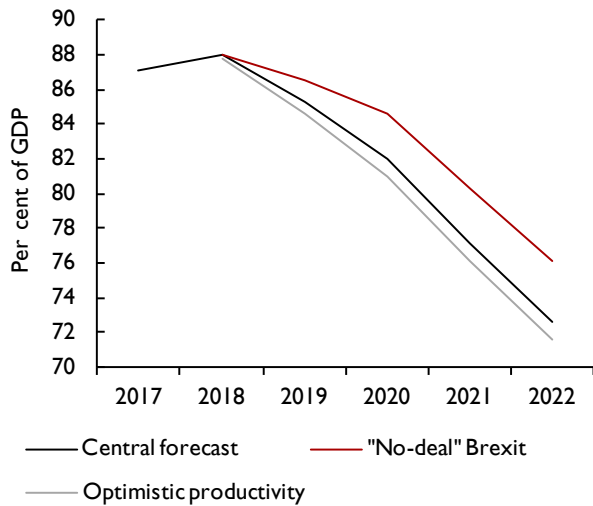
Figure 15. Public sector net borrowing and variants



Source: NiGEM and NiGEM simulations.

Notes: The central forecast is based on taxation and spending plans from the Autumn 2017 Budget. Assumptions underlying the "no-deal" Brexit scenario are explained in Box B. The optimistic productivity scenario assumes a 0.5 percentage points higher growth rate of output per hour between 2018 and 2021 compared to the central forecast.

Figure 16 Public sector net debt and variants



Source: NiGEM and NiGEM simulations.

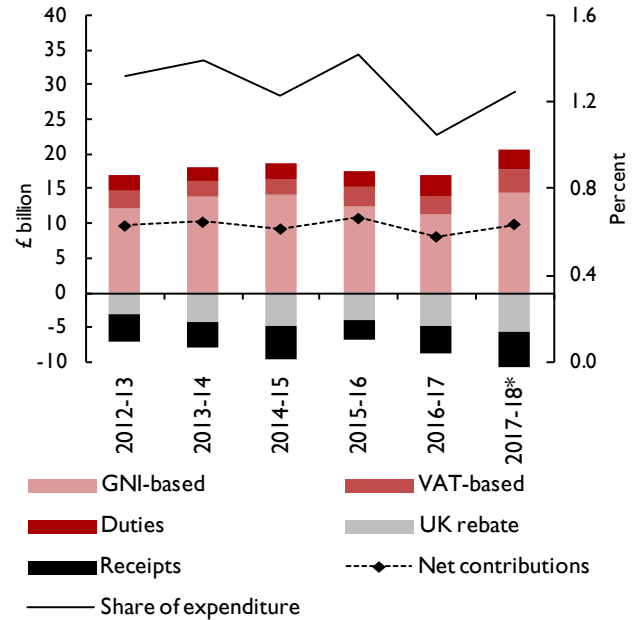
Notes: The central forecast is based on taxation and spending plans from the Autumn 2017 Budget. Assumptions underlying the "no-deal" Brexit scenario are explained in Box B. The optimistic productivity scenario assumes a 0.5 percentage points higher growth rate of output per hour between 2018 and 2021 compared to the central forecast.

optimistic assumption about the growth rate of labour productivity growth of 2 per cent per year, similar to the one adopted by the OBR prior to their revision, would lead to a somewhat sharper fall in public sector borrowing and debt.

Brexit risks

Our central forecast makes the assumption of a 'soft' Brexit. Consistent with that view, we assume that the UK will continue to make contributions to the EU budget as if it were not leaving the EU, using projections from the OBR for such a scenario. Figure 17 plots the evolution of financial flows between the UK government and the EU for the recent past. Each member state pays a share of its VAT receipts and a share of gross national income into the EU Budget. In addition, custom tariffs and levies are collected by member states on behalf of the EU, of which 20 per cent are kept to cover collection costs and the rest is also transferred to the EU. At the same time, member state governments receive funding from the EU for agriculture subsidies and support for regional development. Unlike other member states, the UK receives a rebate of 34 per cent on the difference between contributions and receipts. Contributions net of receipts and the UK rebate amount to around £10 billion a year and have been relatively stable in the recent past. Government net contributions constitute

Figure 17. Government contributions to the EU budget



Source: HM Treasury, NiGEM and NIESR calculations.

Note: * planned.

a very small share of total government expenditure of around 1 per cent.

After exiting the EU, the contributions would reduce, depending on the form of the future trade relationship. However, even under a 'no-deal' Brexit scenario, that is described in Box B, contributions may not fall to zero as the UK may decide to remain part of selected EU programmes, like Horizon 2020. In addition, outstanding liabilities will need to be transferred for an extended period, following the methodology laid out in the Phase 1 agreement, which does not yet pin down the size of these liabilities. Repatriating some of the current contributions would therefore have only a very small and temporary expansionary effect on the economy if recycled into domestic government spending.

By contrast, a 'no-deal' Brexit would come with considerable costs to the British taxpayer. The deceleration in growth from a reduction in trade, investment, migration and productivity would put pressure on public finances. Figures 15 and 16 depict variants for the evolution of public sector net borrowing and debt taking into account longer-term economic effects of a 'no-deal' Brexit but abstracting from short-term disturbances in the financial sector that may have additional fiscal consequences. The deficit-to-GDP

ratio would rise by around 0.7 percentage point within a year after Brexit materialises. This has long-lasting effects on net debt relative to GDP, which would remain 3 percentage points higher than our central forecast.

Saving and investment

Table A9 shows the financial position of the private and public sectors of the economy and the resulting balance with the rest of the world. The private sector is further split into a household and a corporate sector. If investment is greater than saving for a sector, then this sector is a net borrower. The aggregation of these three sectors is the current account balance, which, if in deficit, implies that borrowing from the rest of the world is required in order to fund domestic investment plans. It is not possible to infer the optimality of the levels of capital from the current account but rather just the immediate financing needs of the economy. In 2017, all three domestic sectors of the economy – households, companies and government – were in deficit, for the first time since at least 1987 (figure 18).

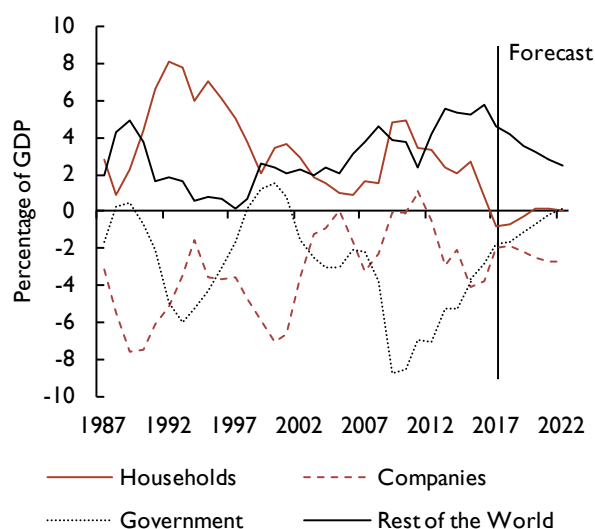
Household sector

Household saving rebounded from a historic low of 2.7 per cent of GDP in the first quarter of 2017 to 4.3 per cent in the second quarter. It followed a period of continuous decline that had started in the third quarter of 2015 when household saving was at 7 per cent of GDP. Notwithstanding a small decline to 3.8 per cent in the third quarter of 2017, the recent pick-up of saving in 2017 was the result of personal disposable income increasing somewhat faster than consumption. We forecast household saving to stay at the current level of about 3½ to 4 per cent of GDP until the end of 2018, and then to increase gradually to around 5 per cent of GDP over the forecast horizon, which is still lower than the long-term average of 7 per cent. We would expect an increase in saving to be the result of personal disposable income growing as a percentage of GDP while consumption remains flat.

Household investment rose from a trough of 2.9 per cent of GDP in 2009 to 4½ per cent of GDP in the first three quarters of 2017, just shy of the pre-crisis high of 4.7 per cent in the first quarter of 2007. We expect household investment to remain roughly constant at 4.6 per cent of GDP in 2018, despite a slowdown in house price growth. From 2019 onwards, we project household investment to increase in each subsequent year and to reach 5 to 5½ per cent of GDP in 2021.

The saving and investment positions of the household sector imply that in 2017 households required 0.8 per

Figure 18. UK sectoral financial balances



Source: NiGEM database and current forecast.

cent of GDP in funding from the rest of the economy. This represents the first time the household sector has been a net borrower since at least 1987. As household saving picks up faster than investment, we expect households to return to a zero net borrowing position over the next three years, and to stay in this position to the end of the forecast horizon. Risks to our forecast of the household net position centre around household saving. Should consumption expenditure grow at stronger levels than envisaged in our forecast, then we would expect household saving to be lower and household lending smaller. Conversely, events such as a sharp increase in unemployment, resulting in greater uncertainty about employment prospects, could trigger a greater increase in household saving. Higher earnings, triggered by higher public sector wage growth or from the phasing-in of the National Living Wage, could also raise the saving ratio, provided that employment levels are not lowered.

Corporate sector

Corporate saving increased from its nadir of 4.4 per cent of GDP at the end of 2015 to 8.1 per cent in the third quarter of 2017. Corporate investment declined since the third quarter of 2016 from 11.2 per cent of GDP to around 10 per cent in 2017. We forecast corporate investment to strengthen as a result of our assumption of a soft Brexit, and its share of GDP to increase gradually to 10½ per cent at the end of the forecast horizon. Because companies invest more than

they save, the corporate sector is a net borrower and, in the third quarter of 2017, required 1.8 per cent of GDP of financing from the rest of the economy. In the following years, the corporate sector will borrow slightly more from the rest of the economy, up to 2½–3 per cent of GDP in 2022, as corporate saving decreases marginally from 8.2 per cent of GDP in 2018 to about 8 per cent in 2022.

Government sector

Government sector dis-saving reached a peak in 2009 of around 5½ per cent of GDP. The subsequent ongoing fiscal consolidation has since reduced dis-saving. In the first quarter of 2017, saving turned positive to 1.5 per cent of GDP. The level of saving in the first quarter was the temporary consequence of higher receipts from changing taxation on income and wealth. We expect government saving to increase throughout the rest of our forecast horizon, reaching around 3 per cent by 2022 as government consumption should fall from currently around 18½ per cent of GDP to 16½ in 2022.

Since 2012, government investment as a percentage of GDP has been around 2½ per cent. Our projections show that it will remain close to this level in both 2018 and 2019, and slowly increase thereafter, reaching 2.8 per cent of GDP in 2022. For 2018, this implies that the government will require around 1.6 per cent of GDP of borrowing from the rest of the economy. Government net borrowing should decrease in the following years, until it reaches balance in 2021, one year earlier than in our November 2017 forecast.

Current account

In aggregate, the economy was a net borrower from the rest of the world of about 4.6 per cent of GDP in 2017, and is expected to borrow up to 4.2 per cent in 2018. We forecast that the UK's large net borrowing position will decrease in the subsequent years. By 2022, the UK should only require 2½ per cent of GDP of finance from the rest of the world.

The primary income account, which measures the inward flow of income generated on assets held in foreign countries, net of outward flows of income generated on assets in the UK held by foreign entities, is a key component of our forecast for the UK current account. These credits and debits would appear as saving on the net positions of the broad sectors previously described. Historically, the primary income was broadly in balance, ranging between a deficit of 1 per cent of GDP and a surplus of 1 per cent between 1960 and 2012. From 2013 to 2016, a deficit in the primary income account

opened up, reaching 3.7 per cent in the final quarter of 2015. The depreciation of sterling by 20 per cent on a trade-weighted basis between late 2015 and late 2016 was a key factor in the reduction of the primary income deficit from 3.7 to 1.6 per cent of GDP in the first quarter of 2017. That is because the stock of foreign assets and the flow of credits, priced in sterling, increased as a result of the exchange rate depreciation, while the stock of liabilities priced in foreign currency remained the same. Despite being pushed up slightly to 2.2 per cent of GDP in the third quarter of 2017, we forecast the primary account deficit to disappear gradually by 2021.

Medium term projections

In table A10, we outline our view on how the UK economy transitions to its medium-term equilibrium state. The nature of the trading relationship between the UK and the European Union is likely to be the key determinant of the long-run equilibrium of the economy. The UK will leave the EU in March 2019 and an exit plan will need to be approved by the European Council, the British parliament, as well as other sovereign parliaments across the EU, to avoid a cliff edge scenario where the trading relationship switches from the existing single market/customs union arrangement to the more restrictive WTO rules (see Boxes B and C for an in depth discussion of the trade-offs involved).

Alongside the uncertainty surrounding the nature of the final equilibrium, the path we take to get there is also uncertain, as shocks, which are by definition unpredictable, will buffet the economy away from its trajectory. We illustrate this uncertainty in the form of fan charts. Figure 2 shows that the probability of average growth of less than 0.7 per cent this year is 10 per cent, as is the probability of average growth greater than 2.7 per cent.

Brexit

The most significant change between our current forecast and that published in November concerns our Brexit assumptions. In the base case we assume a soft Brexit that corresponds to a high level but incomplete market access for both goods and services and a budgetary contribution that is broadly similar to present levels. We foresee a less comprehensive trade relationship as the UK adopts new regulations over time that diverge from the EU and this is reflected in negative residuals to the export and import volume equations. In addition, the smaller degree of competition due to lower trade volumes, less investment and a reduction in skilled migration are almost certain to drive productivity lower. However, we have not explicitly introduced a Brexit-related productivity shock

into our base forecast. A detailed discussion of our Brexit-related forecast assumptions is contained in Box B. A key risk to the medium term is an unsuccessful conclusion to the Brexit negotiations and reverting to WTO trade rules. Box B shows that under this scenario a recession would follow within one year and in the subsequent years the growth rate of real GDP would be lower than assumed in our central forecast whilst inflation would increase. As the negotiation process unfolds and the relative positions of the UK and EU become clearer we will update our assumptions accordingly.

Population

It is worth highlighting the change to our population projections since our November *Review*. They follow revised ONS principal population projections which show a slightly higher starting point in 2016, but a slower growth rate thereafter. We now expect the working age population to be around 300 thousand lower, and the labour force to be around 200 thousand lower each year on average in 2017–21. In simulations carried out in the section on Supply Conditions, figure 14 shows that this drags real GDP growth around 0.1 percentage points lower than our previous baseline forecast over the same period whilst lowering unemployment and pushing up real wage growth. The ONS does not make any Brexit-specific assumptions in this forecast and as such, the risks to net migration and GDP growth are skewed to the downside.

Monetary policy/effective exchange rate/inflation

Our assumptions regarding monetary policy since our November *Review* remain unchanged. Interest rates are assumed to increase gradually throughout our forecast period at an average of 50 basis points a year after the initial tightening in 2017/18.

The near-term movements in the exchange rate, as measured by the sterling exchange rate against a trade weighted broad basket of currencies, has slightly appreciated from the path we had predicted in the previous forecast. Our forecast for the exchange rate is driven via a risk adjusted uncovered interest rate parity condition. Looking ahead, we now expect a slightly stronger appreciation in 2018 of 2 per cent rather than ½ per cent. From 2020 onwards we forecast that the exchange rate will remain flat – unchanged from our previous forecast, which implies that sterling, on a trade-weighted basis, between 2020 and 2025 will remain around 12½ per cent lower than it was at its peak in 2015.

Our forecasts for CPI inflation are broadly unchanged. Our forecast suggests that inflation will remain above the

Bank of England's target until the latter half of 2019. The risks to the medium-term inflation forecast are thought to be balanced. Excluding Brexit related issues, a key risk to the upside is the potential for earnings growth to pick up. As already discussed, we identify two key drivers: the lifting of the public sector pay cap and associated private sector pay catch up, as well as the national living wage rising faster than productivity growth and the potential spillover of this into the next rung of the wage ladder or wages more generally. On the downside, any return of productivity growth from its current low levels to historic norms would ease inflationary pressure, *ceteris paribus*.

Real activity/productivity/employment

In the medium term, GDP growth has been marginally revised upwards from 1.6 per cent to 1.7 per cent per annum. Our assumption for labour productivity is cautious. In the central case, labour productivity growth recovers gradually from 0.4 per cent in 2017 to 1.1 per cent in 2022, which is still below the 20-year average of 1.3 per cent. In terms of the components of demand, private consumption is relatively weak as inflation erodes the purchasing power of households. This is, however, offset by a positive contribution to GDP from net trade as more robust demand conditions in Europe lead to a pick-up in export growth, while weaker domestic demand conditions lead to lower import growth.

Since the peak of unemployment in 2011, the performance of the labour market has been exceptionally robust, with unemployment falling to 4.3 per cent in the third quarter of 2017. We expect average earnings growth to increase slightly this year to 2.8 per cent, up from 2.4 per cent in the last, before growing at 3.2 per cent between 2020 and 2025. Overall, this translates into an unemployment rate of around 4.7 per cent over the same period, unchanged from our previous *Review*.

External sector

The improvement in net trade alongside the gradual return to surplus of the primary income account implies an improvement in the current account balance. We expect the average deficit of the current account to be 4.2 per cent this year and to continue to improve throughout our forecast horizon. A key contribution to our forecast for the current account balance emanates from household consumption; should this turn out to be more robust than we envisage, we would expect a larger current account deficit.

Government

Our forecasts for government consumption and investment are based on assumptions outlined in

the OBR's latest *Economic and Fiscal Outlook*. Our forecast for real and nominal GDP growth is, however, faster than the OBR's assumption and, as a result, we expect the fiscal deficit to be eliminated by 2023. This implies that the public sector net debt stock peaks this year at 88 per cent of GDP in 2018 before gradually falling thereafter.

NOTES

- I See also the speech by Deputy Governor Ben Broadbent on 'Brexit and interest rates', delivered on 15 November 2017 at the London School of Economics.

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Appendix – Forecast details

Table A1. Exchange rates and interest rates

| | UK exchange rates | | | FTSE All-share index | Interest rates | | | | |
|---------------------------|-------------------------|--------|-------|----------------------------|------------------|----------------------|------------------|----------------------|-----------------------------|
| | Effective 2011 = 100 | Dollar | Euro | | 3-month rates | Mortgage interest | 10-year gilts | World ^(a) | Bank Rate ^(b) |
| 2012 | 104.13 | 1.59 | 1.23 | 2617.7 | 0.8 | 4.2 | 1.8 | 1.2 | 0.50 |
| 2013 | 102.78 | 1.56 | 1.18 | 3006.2 | 0.5 | 4.4 | 2.4 | 0.9 | 0.50 |
| 2014 | 110.59 | 1.65 | 1.24 | 3136.6 | 0.5 | 4.4 | 2.5 | 0.9 | 0.50 |
| 2015 | 116.71 | 1.53 | 1.38 | 3150.1 | 0.6 | 4.5 | 1.8 | 0.9 | 0.50 |
| 2016 | 105.41 | 1.35 | 1.22 | 3102.0 | 0.5 | 4.4 | 1.3 | 0.9 | 0.25 |
| 2017 | 100.07 | 1.29 | 1.14 | 3542.4 | 0.4 | 4.4 | 1.2 | 1.1 | 0.41 |
| 2018 | 102.01 | 1.38 | 1.13 | 3700.4 | 0.8 | 4.8 | 1.6 | 1.5 | 0.92 |
| 2019 | 102.19 | 1.39 | 1.12 | 3626.5 | 1.4 | 5.0 | 2.3 | 1.8 | 1.42 |
| 2020 | 102.19 | 1.41 | 1.10 | 3653.7 | 1.8 | 5.1 | 2.9 | 2.2 | 1.78 |
| 2021 | 102.18 | 1.43 | 1.09 | 3731.6 | 2.2 | 5.3 | 3.3 | 2.5 | 2.16 |
| 2022 | 102.16 | 1.44 | 1.08 | 3829.9 | 2.6 | 5.5 | 3.6 | 2.8 | 2.54 |
| 2017 Q1 | 99.54 | 1.24 | 1.16 | 3467.5 | 0.4 | 4.4 | 1.3 | 1.0 | 0.25 |
| 2017 Q2 | 100.71 | 1.28 | 1.16 | 3549.2 | 0.3 | 4.3 | 1.0 | 1.1 | 0.25 |
| 2017 Q3 | 99.13 | 1.31 | 1.11 | 3548.3 | 0.3 | 4.4 | 1.2 | 1.2 | 0.25 |
| 2017 Q4 | 100.90 | 1.33 | 1.13 | 3604.5 | 0.5 | 4.6 | 1.3 | 1.3 | 0.41 |
| 2018 Q1 | 101.69 | 1.36 | 1.13 | 3722.8 | 0.5 | 4.6 | 1.3 | 1.4 | 0.50 |
| 2018 Q2 | 102.10 | 1.38 | 1.13 | 3701.6 | 0.8 | 4.8 | 1.5 | 1.4 | 0.66 |
| 2018 Q3 | 102.10 | 1.38 | 1.13 | 3707.3 | 0.9 | 4.8 | 1.7 | 1.5 | 0.75 |
| 2018 Q4 | 102.15 | 1.38 | 1.12 | 3669.8 | 1.1 | 4.9 | 1.9 | 1.6 | 0.92 |
| 2019 Q1 | 102.18 | 1.39 | 1.12 | 3644.3 | 1.2 | 4.9 | 2.1 | 1.7 | 1.00 |
| 2019 Q2 | 102.20 | 1.39 | 1.12 | 3626.0 | 1.3 | 4.9 | 2.3 | 1.8 | 1.16 |
| 2019 Q3 | 102.20 | 1.40 | 1.11 | 3615.1 | 1.4 | 5.0 | 2.4 | 1.9 | 1.25 |
| 2019 Q4 | 102.20 | 1.40 | 1.11 | 3620.5 | 1.6 | 5.0 | 2.5 | 2.0 | 1.42 |
| <i>Percentage changes</i> | | | | | | | | | |
| 2012/2011 | 4.2 | -1.1 | 7.0 | 1.2 | | | | | |
| 2013/2012 | -1.3 | -1.3 | -4.5 | 14.8 | | | | | |
| 2014/2013 | 7.6 | 5.3 | 5.4 | 4.3 | | | | | |
| 2015/2014 | 5.5 | -7.2 | 11.1 | 0.4 | | | | | |
| 2016/2015 | -9.7 | -11.4 | -11.2 | -1.5 | | | | | |
| 2017/2016 | -5.1 | -4.9 | -6.7 | 14.2 | | | | | |
| 2018/2017 | 1.9 | 6.7 | -1.5 | 4.5 | | | | | |
| 2019/2018 | 0.2 | 1.3 | -0.8 | -2.0 | | | | | |
| 2020/2019 | 0.0 | 1.2 | -1.1 | 0.7 | | | | | |
| 2021/2020 | 0.0 | 1.2 | -1.1 | 2.1 | | | | | |
| 2022/2021 | 0.0 | 1.1 | -1.1 | 2.6 | | | | | |
| 2017Q4/2016Q4 | 2.2 | 6.9 | -2.1 | 9.2 | | | | | |
| 2018Q4/2017Q4 | 1.2 | 4.2 | -0.4 | 1.8 | | | | | |
| 2019Q4/2018Q4 | 0.0 | 1.2 | -1.0 | -1.3 | | | | | |

Notes: We assume that bilateral exchange rates for the first quarter of this year are the average of information available to 12 January 2018. We then assume that bilateral rates remain constant for the following two quarters before moving in line with the path implied by the backward-looking uncovered interest rate parity condition based on interest rate differentials relative to the US. (a) Weighted average of central bank intervention rates in OECD economies. (b) End of period.

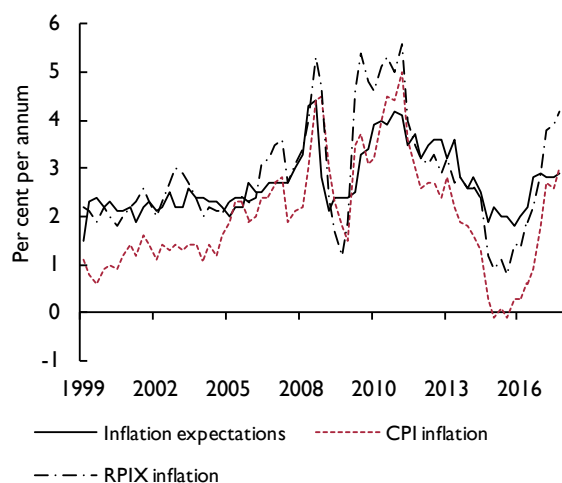
Table A2. Price indices

2015=100

| | Unit labour costs | Imports deflator | Exports deflator | Whole-sale price index ^(a) | World oil price (\$) ^(b) | Consumption deflator | GDP deflator (market prices) | Retail price index | | |
|--------------------|-------------------|------------------|------------------|---------------------------------------|-------------------------------------|----------------------|------------------------------|--------------------|-----------------------------|-----------------------|
| | | | | | | | | All items | Excluding mortgage interest | Consumer prices index |
| 2012 | 98.3 | 110.1 | 105.3 | 98.2 | 112.5 | 95.3 | 96.0 | 93.9 | 93.8 | 96.1 |
| 2013 | 100.2 | 111.0 | 108.3 | 99.0 | 109.1 | 97.5 | 97.9 | 96.7 | 96.6 | 98.5 |
| 2014 | 99.3 | 106.3 | 105.3 | 99.8 | 99.6 | 99.4 | 99.5 | 99.0 | 99.0 | 99.9 |
| 2015 | 100.0 | 100.0 | 100.0 | 100.0 | 52.8 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 2016 | 102.2 | 103.3 | 104.8 | 101.1 | 43.4 | 101.4 | 102.0 | 101.7 | 101.9 | 100.7 |
| 2017 | 104.4 | 109.4 | 110.4 | 103.7 | 53.8 | 103.5 | 103.7 | 105.4 | 105.7 | 103.4 |
| 2018 | 106.2 | 113.9 | 110.6 | 106.5 | 69.0 | 106.0 | 105.1 | 110.1 | 109.3 | 106.2 |
| 2019 | 108.8 | 115.4 | 112.0 | 109.7 | 70.3 | 108.5 | 107.6 | 114.5 | 112.3 | 108.4 |
| 2020 | 111.3 | 117.1 | 113.5 | 113.1 | 72.0 | 110.9 | 110.0 | 118.7 | 115.3 | 110.6 |
| 2021 | 113.6 | 119.3 | 115.4 | 116.4 | 72.3 | 113.4 | 112.5 | 123.3 | 118.4 | 112.8 |
| 2022 | 115.5 | 121.9 | 117.5 | 119.4 | 72.6 | 116.0 | 115.0 | 127.9 | 121.6 | 115.2 |
| Percentage changes | | | | | | | | | | |
| 2012/2011 | 0.8 | -0.7 | 0.2 | 1.1 | 1.8 | 2.1 | 1.6 | 3.2 | 3.2 | 2.9 |
| 2013/2012 | 1.9 | 0.8 | 2.9 | 0.8 | -3.0 | 2.4 | 1.9 | 3.0 | 3.1 | 2.6 |
| 2014/2013 | -0.9 | -4.2 | -2.7 | 0.9 | -8.7 | 1.9 | 1.7 | 2.4 | 2.4 | 1.4 |
| 2015/2014 | 0.7 | -5.9 | -5.1 | 0.2 | -47.0 | 0.6 | 0.5 | 1.0 | 1.0 | 0.1 |
| 2016/2015 | 2.2 | 3.3 | 4.8 | 1.1 | -17.7 | 1.4 | 2.0 | 1.7 | 1.9 | 0.7 |
| 2017/2016 | 2.2 | 5.9 | 5.4 | 2.6 | 23.9 | 2.1 | 1.7 | 3.6 | 3.8 | 2.7 |
| 2018/2017 | 1.7 | 4.1 | 0.2 | 2.6 | 28.2 | 2.4 | 1.3 | 4.4 | 3.4 | 2.7 |
| 2019/2018 | 2.4 | 1.4 | 1.3 | 3.0 | 1.9 | 2.3 | 2.4 | 4.0 | 2.7 | 2.1 |
| 2020/2019 | 2.3 | 1.4 | 1.4 | 3.1 | 2.4 | 2.2 | 2.3 | 3.7 | 2.6 | 2.0 |
| 2021/2020 | 2.0 | 1.9 | 1.6 | 3.0 | 0.4 | 2.3 | 2.2 | 3.9 | 2.7 | 2.0 |
| 2022/2021 | 1.7 | 2.2 | 1.8 | 2.6 | 0.4 | 2.3 | 2.2 | 3.8 | 2.7 | 2.1 |
| 2017Q4/2016Q4 | 2.0 | 3.0 | 0.7 | 2.6 | 18.4 | 1.9 | 1.0 | 4.1 | 4.0 | 3.0 |
| 2018Q4/2017Q4 | 1.9 | 3.6 | 1.3 | 2.8 | 19.4 | 2.6 | 2.0 | 4.5 | 3.1 | 2.4 |
| 2019Q4/2018Q4 | 2.5 | 1.2 | 1.3 | 3.1 | 1.8 | 2.3 | 2.3 | 3.8 | 2.7 | 2.0 |

Notes: (a) Excluding food, beverages, tobacco and petroleum products. (b) Per barrel, average of Dubai and Brent spot prices.

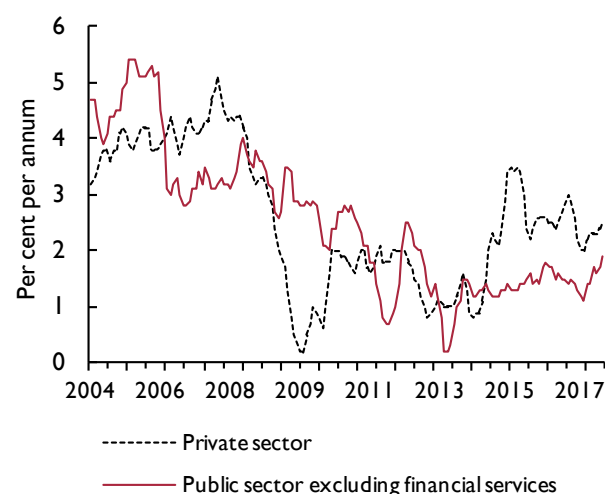
Figure A1. Household inflation expectations for the year ahead have flattened



Source: Bank of England/TNS Inflation Attitudes Survey, ONS.

Note: Inflation expectation is for the rate of inflation 12 months ahead. Contemporaneous inflation rates are for the month available during the month of the survey.

Figure A2. Private and public sector nominal wage growth remain subdued



Source: ONS.

Note: Regular pay, excluding bonuses and arrears.

Table A3. Gross domestic product and components of expenditure £ billion, 2015 prices

| | Final consumption expenditure | | Gross capital formation | | Domestic demand | Total exports ^(c) | Total final expenditure | Total imports ^(c) | Net trade | GDP at market prices |
|---------------------------------------|-----------------------------------|---------------|-------------------------|---------------------------------------|-----------------|------------------------------|-------------------------|------------------------------|-----------|----------------------|
| | Households & NPISH ^(a) | General govt. | Gross fixed in-vestment | Changes in inventories ^(b) | | | | | | |
| 2012 | 1162.4 | 350.4 | 275.2 | -0.4 | 1761.7 | 475.9 | 2238.0 | 485.2 | -9.3 | 1754.7 |
| 2013 | 1182.5 | 351.1 | 284.6 | 3.0 | 1810.0 | 479.9 | 2289.8 | 500.5 | -20.5 | 1790.8 |
| 2014 | 1207.6 | 359.9 | 304.7 | 5.5 | 1875.4 | 492.7 | 2367.5 | 522.8 | -30.1 | 1845.4 |
| 2015 | 1238.5 | 362.1 | 313.2 | 7.4 | 1921.1 | 517.2 | 2438.3 | 549.5 | -32.4 | 1888.7 |
| 2016 | 1274.9 | 365.1 | 318.8 | 4.8 | 1963.6 | 529.2 | 2492.8 | 576.1 | -46.9 | 1925.3 |
| 2017 | 1293.6 | 366.3 | 328.8 | -2.2 | 1986.5 | 560.8 | 2547.3 | 593.5 | -32.7 | 1960.0 |
| 2018 | 1309.0 | 370.4 | 337.6 | -2.5 | 2014.6 | 583.2 | 2597.7 | 607.0 | -23.8 | 1997.1 |
| 2019 | 1323.6 | 372.9 | 348.7 | -1.6 | 2043.7 | 604.9 | 2648.6 | 620.6 | -15.6 | 2034.5 |
| 2020 | 1340.8 | 374.7 | 361.7 | -0.8 | 2076.5 | 623.6 | 2700.1 | 636.8 | -13.2 | 2069.7 |
| 2021 | 1359.1 | 378.6 | 371.3 | -0.1 | 2108.9 | 642.3 | 2751.2 | 654.4 | -12.2 | 2103.2 |
| 2022 | 1377.1 | 382.4 | 380.0 | 0.0 | 2139.5 | 661.1 | 2800.6 | 669.9 | -8.8 | 2137.1 |
| <i>Percentage changes</i> | | | | | | | | | | |
| 2012/2011 | 1.6 | 1.3 | 2.1 | | 2.3 | 0.2 | 1.8 | 2.7 | | 1.5 |
| 2013/2012 | 1.7 | 0.2 | 3.4 | | 2.7 | 0.8 | 2.3 | 3.1 | | 2.1 |
| 2014/2013 | 2.1 | 2.5 | 7.1 | | 3.6 | 2.7 | 3.4 | 4.5 | | 3.1 |
| 2015/2014 | 2.6 | 0.6 | 2.8 | | 2.4 | 5.0 | 3.0 | 5.1 | | 2.3 |
| 2016/2015 | 2.9 | 0.8 | 1.8 | | 2.2 | 2.3 | 2.2 | 4.8 | | 1.9 |
| 2017/2016 | 1.5 | 0.3 | 3.2 | | 1.2 | 6.0 | 2.2 | 3.0 | | 1.8 |
| 2018/2017 | 1.2 | 1.1 | 2.7 | | 1.4 | 4.0 | 2.0 | 2.3 | | 1.9 |
| 2019/2018 | 1.1 | 0.7 | 3.3 | | 1.4 | 3.7 | 2.0 | 2.2 | | 1.9 |
| 2020/2019 | 1.3 | 0.5 | 3.7 | | 1.6 | 3.1 | 1.9 | 2.6 | | 1.7 |
| 2021/2020 | 1.4 | 1.0 | 2.6 | | 1.6 | 3.0 | 1.9 | 2.8 | | 1.6 |
| 2022/2021 | 1.3 | 1.0 | 2.4 | | 1.5 | 2.9 | 1.8 | 2.4 | | 1.6 |
| <i>Decomposition of growth in GDP</i> | | | | | | | | | | |
| 2012 | 1.1 | 0.3 | 0.3 | 0.2 | 2.2 | 0.1 | 2.3 | -0.8 | -0.7 | 1.5 |
| 2013 | 1.1 | 0.0 | 0.5 | 0.2 | 2.8 | 0.3 | 3.0 | -0.9 | -0.6 | 2.1 |
| 2014 | 1.4 | 0.5 | 1.1 | 0.1 | 3.6 | 0.8 | 4.3 | -1.3 | -0.5 | 3.1 |
| 2015 | 1.7 | 0.1 | 0.5 | 0.1 | 2.5 | 1.3 | 3.8 | -1.5 | -0.1 | 2.3 |
| 2016 | 1.9 | 0.2 | 0.3 | -0.1 | 2.2 | 0.6 | 2.9 | -1.4 | -0.8 | 1.9 |
| 2017 | 1.0 | 0.1 | 0.5 | -0.4 | 1.2 | 1.6 | 2.8 | -0.9 | 0.7 | 1.8 |
| 2018 | 0.8 | 0.2 | 0.4 | 0.0 | 1.4 | 1.1 | 2.6 | -0.7 | 0.5 | 1.9 |
| 2019 | 0.7 | 0.1 | 0.6 | 0.0 | 1.5 | 1.1 | 2.5 | -0.7 | 0.4 | 1.9 |
| 2020 | 0.8 | 0.1 | 0.6 | 0.0 | 1.6 | 0.9 | 2.5 | -0.8 | 0.1 | 1.7 |
| 2021 | 0.9 | 0.2 | 0.5 | 0.0 | 1.6 | 0.9 | 2.5 | -0.9 | 0.1 | 1.6 |
| 2022 | 0.9 | 0.2 | 0.4 | 0.0 | 1.5 | 0.9 | 2.3 | -0.7 | 0.2 | 1.6 |

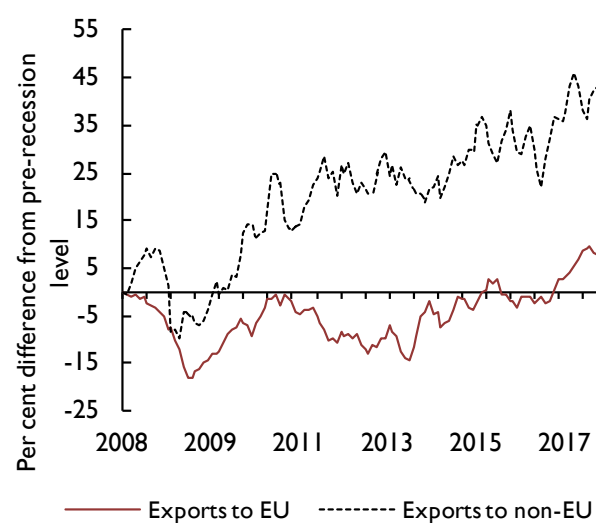
Notes: (a) Non-profit institutions serving households. (b) Including acquisitions less disposals of valuables and quarterly alignment adjustment. (c) Includes Missing Trader Intra-Community Fraud. (d) Components may not add up to total GDP growth due to rounding and the statistical discrepancy included in GDP.

Table A4. External sector

| | Exports of goods ^(a) | Imports of goods ^(a) | Net trade in goods ^(a) | Exports of services | Imports of services | Net trade in services | Export price competitive- ness ^(c) | World trade ^(d) | Terms of trade ^(e) | Current balance |
|---------------------------|---------------------------------------|------------------------------------|---|---------------------------|---------------------------|-----------------------------|--|-------------------------------|----------------------------------|--------------------|
| | £ billion, 2015 prices ^(b) | | | | | | 2015=100 | | % of GDP | |
| 2012 | 266.9 | 365.6 | -98.7 | 208.5 | 119.3 | 89.2 | 95.8 | 88.6 | 95.6 | -4.2 |
| 2013 | 264.1 | 375.3 | -111.2 | 216.2 | 125.0 | 91.2 | 96.8 | 91.0 | 97.6 | -5.5 |
| 2014 | 272.9 | 392.0 | -119.1 | 220.0 | 130.7 | 89.3 | 100.6 | 95.2 | 99.1 | -5.3 |
| 2015 | 288.8 | 407.4 | -118.6 | 228.4 | 142.1 | 86.3 | 100.0 | 100.0 | 100.0 | -5.2 |
| 2016 | 286.2 | 425.7 | -139.4 | 242.9 | 150.4 | 92.5 | 97.6 | 103.9 | 101.4 | -5.8 |
| 2017 | 310.2 | 442.0 | -131.8 | 250.6 | 151.5 | 99.1 | 93.6 | 107.3 | 100.9 | -4.6 |
| 2018 | 332.7 | 455.3 | -122.7 | 250.5 | 151.7 | 98.8 | 92.9 | 112.4 | 97.1 | -4.2 |
| 2019 | 350.8 | 466.4 | -115.6 | 254.2 | 154.2 | 99.9 | 91.4 | 117.5 | 97.0 | -3.5 |
| 2020 | 364.3 | 479.4 | -115.0 | 259.3 | 157.4 | 101.8 | 90.4 | 121.7 | 97.0 | -3.2 |
| 2021 | 376.9 | 493.5 | -116.7 | 265.4 | 160.9 | 104.5 | 89.5 | 125.8 | 96.7 | -2.8 |
| 2022 | 388.8 | 505.7 | -116.9 | 272.3 | 164.2 | 108.0 | 88.9 | 129.8 | 96.3 | -2.5 |
| <i>Percentage changes</i> | | | | | | | | | | |
| 2012/2011 | -1.7 | 2.4 | | 3.3 | 4.0 | | 1.6 | 1.5 | 0.9 | |
| 2013/2012 | -1.0 | 2.7 | | 3.7 | 4.8 | | 1.0 | 2.8 | 2.1 | |
| 2014/2013 | 3.3 | 4.4 | | 1.7 | 4.5 | | 3.9 | 4.6 | 1.5 | |
| 2015/2014 | 5.8 | 3.9 | | 3.8 | 8.8 | | -0.6 | 5.1 | 0.9 | |
| 2016/2015 | -0.9 | 4.5 | | 6.4 | 5.8 | | -2.4 | 3.9 | 1.4 | |
| 2017/2016 | 8.4 | 3.8 | | 3.2 | 0.7 | | -4.1 | 3.2 | -0.5 | |
| 2018/2017 | 7.3 | 3.0 | | 0.0 | 0.1 | | -0.7 | 4.7 | -3.8 | |
| 2019/2018 | 5.4 | 2.4 | | 1.5 | 1.7 | | -1.6 | 4.5 | -0.1 | |
| 2020/2019 | 3.9 | 2.8 | | 2.0 | 2.1 | | -1.1 | 3.6 | 0.0 | |
| 2021/2020 | 3.4 | 2.9 | | 2.4 | 2.2 | | -1.0 | 3.3 | -0.3 | |
| 2022/2021 | 3.2 | 2.5 | | 2.6 | 2.0 | | -0.7 | 3.2 | -0.3 | |

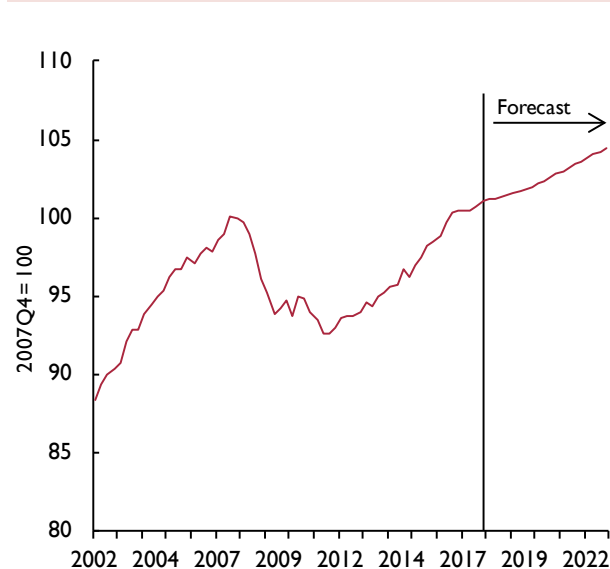
Notes: (a) Includes Missing Trader Intra-Community Fraud. (b) Balance of payments basis. (c) A rise denotes a loss in UK competitiveness. (d) Weighted by import shares in UK export markets. (e) Ratio of average value of exports to imports.

Figure A3. Goods exports volumes to the EU have surpassed the 2007 level



Notes: Percentage difference is exports to EU and non-EU countries from their pre-recession level. 3-month moving averages. Volume of goods exports. Pre-recession peak is January 2008, defined by NIESR's monthly estimate of GDP.

Figure A4. Per capita consumer spending has exceeded its pre-recession peak (2007Q4=100)



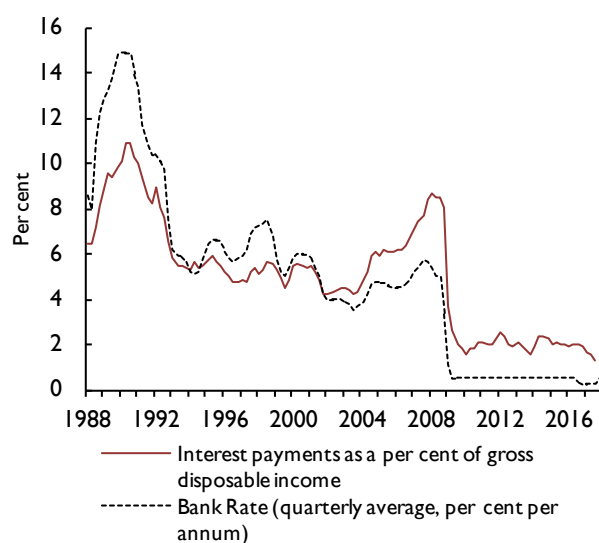
Sources: ONS, NIESR forecast.

Table A5. Household sector

| | Average ^(a) | Compen- sation of employees | Total personal income | Gross disposable income | Real disposable income ^(b) | Final consumption expenditure | | Saving ratio ^(c) | House prices ^(d) | Net worth to income ratio ^(e) |
|---------------------------|------------------------|-----------------------------------|-----------------------------|-------------------------------|---|----------------------------------|---------|--------------------------------|--------------------------------|---|
| | 2015=100 | £ billion, current prices | | | | £ billion, 2015 prices | | per cent | | |
| | | | | | | Total | Durable | | | |
| 2012 | 96.0 | 849.4 | 1484.0 | 1166.3 | 1224.2 | 1162.4 | 91.0 | 9.3 | 87.6 | 6.3 |
| 2013 | 98.7 | 883.5 | 1535.1 | 1208.2 | 1238.9 | 1182.5 | 96.6 | 8.6 | 89.9 | 6.2 |
| 2014 | 99.0 | 902.3 | 1577.9 | 1243.5 | 1250.8 | 1207.6 | 104.1 | 8.4 | 97.1 | 6.7 |
| 2015 | 100.0 | 930.2 | 1669.0 | 1317.3 | 1317.2 | 1238.5 | 112.7 | 9.2 | 102.9 | 6.8 |
| 2016 | 103.2 | 968.9 | 1707.1 | 1338.4 | 1320.5 | 1274.9 | 119.0 | 7.1 | 110.1 | 7.3 |
| 2017 | 106.1 | 1007.7 | 1757.4 | 1370.0 | 1323.6 | 1293.6 | 119.3 | 5.2 | 115.1 | 7.3 |
| 2018 | 109.1 | 1044.6 | 1824.9 | 1424.3 | 1343.9 | 1309.0 | 121.3 | 5.6 | 117.4 | 7.1 |
| 2019 | 112.4 | 1089.9 | 1904.2 | 1485.1 | 1369.3 | 1323.6 | 124.5 | 6.3 | 118.8 | 6.9 |
| 2020 | 116.0 | 1134.3 | 1986.4 | 1547.9 | 1395.9 | 1340.8 | 126.8 | 6.9 | 119.9 | 6.7 |
| 2021 | 119.8 | 1176.2 | 2067.8 | 1609.6 | 1419.3 | 1359.1 | 128.2 | 7.2 | 120.8 | 6.6 |
| 2022 | 123.6 | 1215.9 | 2149.4 | 1672.3 | 1441.5 | 1377.1 | 129.1 | 7.4 | 121.4 | 6.5 |
| <i>Percentage changes</i> | | | | | | | | | | |
| 2012/2011 | 1.9 | 2.3 | 3.8 | 4.9 | 2.7 | 1.6 | 4.3 | | 0.4 | |
| 2013/2012 | 2.8 | 4.0 | 3.4 | 3.6 | 1.2 | 1.7 | 6.2 | | 2.6 | |
| 2014/2013 | 0.4 | 2.1 | 2.8 | 2.9 | 1.0 | 2.1 | 7.7 | | 8.0 | |
| 2015/2014 | 1.0 | 3.1 | 5.8 | 5.9 | 5.3 | 2.6 | 8.3 | | 6.0 | |
| 2016/2015 | 3.2 | 4.2 | 2.3 | 1.6 | 0.2 | 2.9 | 5.6 | | 7.0 | |
| 2017/2016 | 2.9 | 4.0 | 2.9 | 2.4 | 0.2 | 1.5 | 0.2 | | 4.5 | |
| 2018/2017 | 2.8 | 3.7 | 3.8 | 4.0 | 1.5 | 1.2 | 1.6 | | 2.0 | |
| 2019/2018 | 3.0 | 4.3 | 4.4 | 4.3 | 1.9 | 1.1 | 2.6 | | 1.2 | |
| 2020/2019 | 3.2 | 4.1 | 4.3 | 4.2 | 1.9 | 1.3 | 1.8 | | 0.9 | |
| 2021/2020 | 3.2 | 3.7 | 4.1 | 4.0 | 1.7 | 1.4 | 1.1 | | 0.7 | |
| 2022/2021 | 3.2 | 3.4 | 3.9 | 3.9 | 1.6 | 1.3 | 0.7 | | 0.5 | |

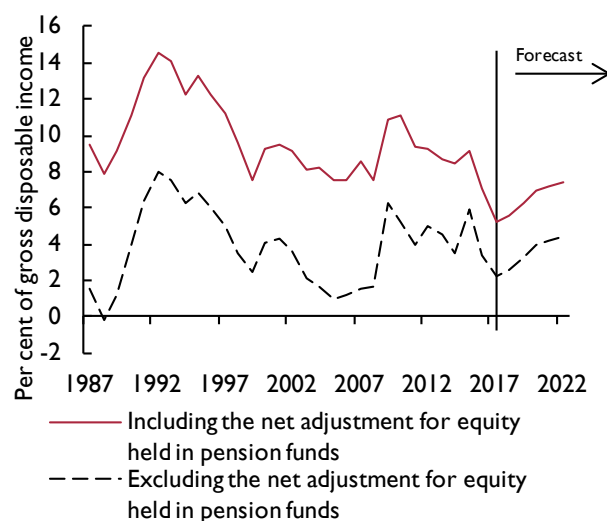
Notes: (a) Average earnings equals total labour compensation divided by the number of employees. (b) Deflated by consumers' expenditure deflator. (c) Includes adjustment for change in net equity of households in pension funds. (d) Office for National Statistics, mix-adjusted. (e) Net worth is defined as housing wealth plus net financial assets.

Figure A5. Household income gearing



Sources: ONS, NIESR forecast.

Figure A6. We expect the household saving ratio to rise over the medium term (per cent of gross disposable incomes)



Sources: ONS, NIESR forecast.

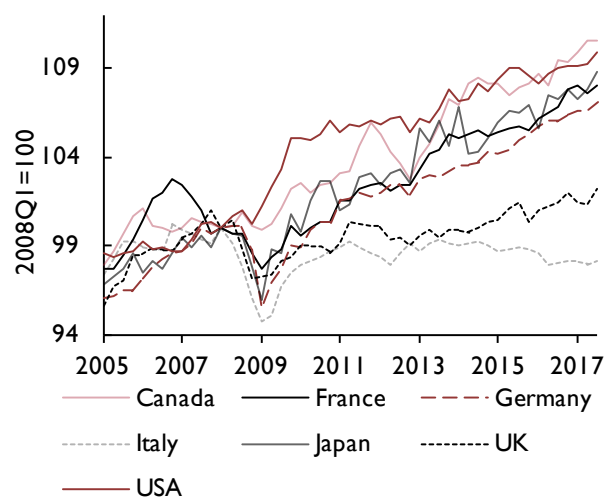
Table A6. Fixed investment and capital

£ billion, 2015 prices

| | Gross fixed investment | | | | User cost of capital (%) | Corporate profit share of GDP (%) | Capital stock | |
|---------------------------|------------------------|--------------------------------|--------------------|-------|--------------------------|-----------------------------------|---------------|-----------------------|
| | Business investment | Private housing ^(a) | General government | Total | | | Private | Public ^(b) |
| 2012 | 160.0 | 58.5 | 56.7 | 275.2 | 13.1 | 24.0 | 3226.1 | 1002.4 |
| 2013 | 164.8 | 65.2 | 54.7 | 284.6 | 12.2 | 24.0 | 3176.9 | 1009.2 |
| 2014 | 173.2 | 71.5 | 60.0 | 304.7 | 12.2 | 25.1 | 3216.2 | 1051.4 |
| 2015 | 179.7 | 75.0 | 58.5 | 313.2 | 11.0 | 24.5 | 3251.6 | 1066.4 |
| 2016 | 179.0 | 80.7 | 59.1 | 318.8 | 10.7 | 24.2 | 3304.7 | 1078.8 |
| 2017 | 182.8 | 85.2 | 60.8 | 328.8 | 11.9 | 24.3 | 3347.7 | 1108.2 |
| 2018 | 187.6 | 88.2 | 61.8 | 337.6 | 12.3 | 24.9 | 3395.4 | 1137.5 |
| 2019 | 193.5 | 92.1 | 63.2 | 348.7 | 12.8 | 25.6 | 3449.4 | 1167.0 |
| 2020 | 198.6 | 96.0 | 67.1 | 361.7 | 12.8 | 26.3 | 3508.7 | 1199.6 |
| 2021 | 203.5 | 99.9 | 67.9 | 371.3 | 13.0 | 26.6 | 3572.7 | 1233.7 |
| 2022 | 207.8 | 103.8 | 68.5 | 380.0 | 13.1 | 27.0 | 3640.5 | 1269.3 |
| <i>Percentage changes</i> | | | | | | | | |
| 2012/2011 | 7.3 | -1.6 | -7.6 | 2.1 | -3.4 | -1.0 | 0.7 | 0.4 |
| 2013/2012 | 3.0 | 11.4 | -3.6 | 3.4 | -6.8 | 0.0 | -1.5 | 0.7 |
| 2014/2013 | 5.1 | 9.7 | 9.8 | 7.1 | -0.2 | 4.6 | 1.2 | 4.2 |
| 2015/2014 | 3.7 | 4.9 | -2.6 | 2.8 | -9.8 | -2.4 | 1.1 | 1.4 |
| 2016/2015 | -0.4 | 7.6 | 1.1 | 1.8 | -2.4 | -1.3 | 1.6 | 1.2 |
| 2017/2016 | 2.2 | 5.6 | 2.7 | 3.2 | 11.0 | 0.4 | 1.3 | 2.7 |
| 2018/2017 | 2.6 | 3.5 | 1.7 | 2.7 | 2.8 | 2.4 | 1.4 | 2.6 |
| 2019/2018 | 3.1 | 4.4 | 2.3 | 3.3 | 4.2 | 3.0 | 1.6 | 2.6 |
| 2020/2019 | 2.7 | 4.2 | 6.2 | 3.7 | 0.4 | 2.5 | 1.7 | 2.8 |
| 2021/2020 | 2.5 | 4.1 | 1.1 | 2.6 | 1.5 | 1.4 | 1.8 | 2.8 |
| 2022/2021 | 2.1 | 3.9 | 0.9 | 2.4 | 0.9 | 1.5 | 1.9 | 2.9 |

Notes: (a) Includes private sector transfer costs of non-produced assets. (b) Including public sector non-financial corporations.

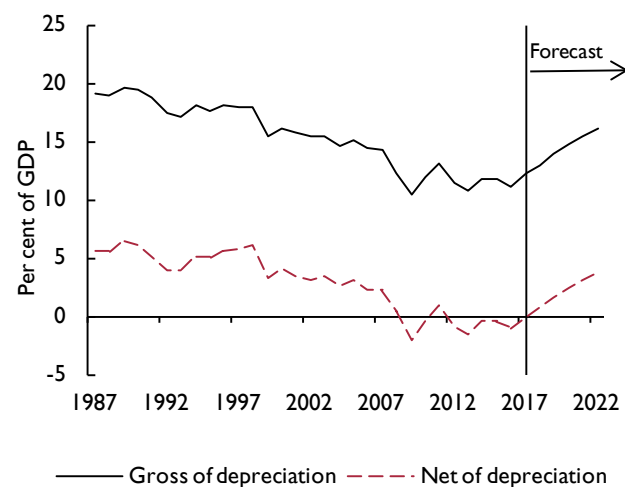
Figure A7. Productivity in the UK has surpassed pre-recession levels



Source: NiGEM database and forecast.

Notes: 2008Q1 = 100. GDP at market prices, per person hour.

Figure A8. National saving rates (per cent of GDP)



Source: NiGEM database and forecast.

Table A7. Productivity and the labour market Thousands

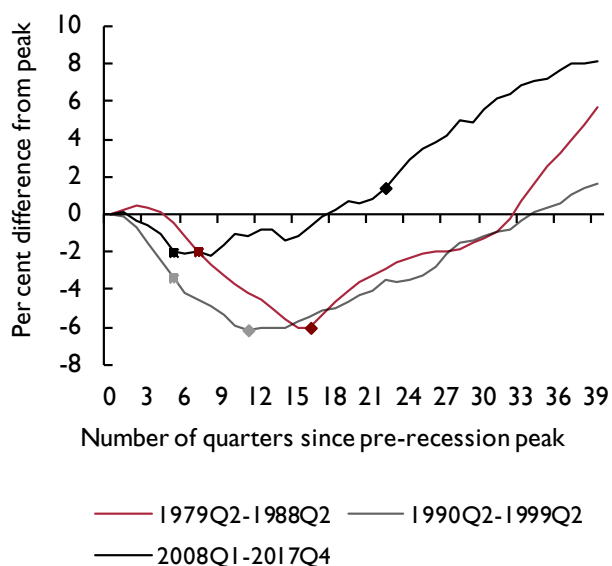
| | Employment | | ILO unemployment | Labour force ^(b) | Population of working age ^(c) | Productivity (2015=100) | | Unemployment, % | |
|------|------------|----------------------|------------------|-----------------------------|--|-------------------------|---------------|-----------------|-----------------------|
| | Employees | Total ^(a) | | | | Per hour | Manufacturing | Claimant rate | ILO unemployment rate |
| 2012 | 25213 | 29697 | 2572 | 32269 | 40507 | 98.7 | 100.3 | 4.7 | 8.0 |
| 2013 | 25515 | 30045 | 2474 | 32519 | 40552 | 98.3 | 100.0 | 4.2 | 7.6 |
| 2014 | 25962 | 30755 | 2026 | 32781 | 40683 | 99.1 | 100.8 | 3.0 | 6.2 |
| 2015 | 26505 | 31284 | 1781 | 33064 | 40873 | 100.0 | 100.0 | 2.3 | 5.4 |
| 2016 | 26760 | 31727 | 1633 | 33360 | 41031 | 100.3 | 100.6 | 2.2 | 4.9 |
| 2017 | 27050 | 32041 | 1473 | 33514 | 41157 | 100.8 | 102.4 | 2.3 | 4.4 |
| 2018 | 27271 | 32177 | 1459 | 33661 | 41275 | 102.2 | 107.3 | 2.4 | 4.3 |
| 2019 | 27623 | 32390 | 1441 | 33855 | 41396 | 103.4 | 112.3 | 2.4 | 4.3 |
| 2020 | 27858 | 32508 | 1517 | 34049 | 41517 | 104.8 | 116.6 | 2.6 | 4.5 |
| 2021 | 27985 | 32681 | 1538 | 34243 | 41638 | 106.0 | 120.6 | 2.6 | 4.5 |
| 2022 | 28030 | 32833 | 1580 | 34437 | 41760 | 107.2 | 124.4 | 2.7 | 4.6 |

Percentage changes

| | | | | | | | | | |
|-----------|-----|-----|-------|-----|------|------|------|--|--|
| 2012/2011 | 0.4 | 1.1 | -0.8 | 0.9 | -0.1 | -0.7 | -2.2 | | |
| 2013/2012 | 1.2 | 1.2 | -3.8 | 0.8 | 0.1 | -0.4 | -0.4 | | |
| 2014/2013 | 1.7 | 2.4 | -18.1 | 0.8 | 0.3 | 0.7 | 0.9 | | |
| 2015/2014 | 2.1 | 1.7 | -12.1 | 0.9 | 0.5 | 1.0 | -0.8 | | |
| 2016/2015 | 1.0 | 1.4 | -8.3 | 0.9 | 0.4 | 0.3 | 0.6 | | |
| 2017/2016 | 1.1 | 1.0 | -9.8 | 0.5 | 0.3 | 0.4 | 1.8 | | |
| 2018/2017 | 0.8 | 0.4 | -0.9 | 0.4 | 0.3 | 1.4 | 4.8 | | |
| 2019/2018 | 1.3 | 0.7 | -1.2 | 0.6 | 0.3 | 1.2 | 4.7 | | |
| 2020/2019 | 0.9 | 0.4 | 5.2 | 0.6 | 0.3 | 1.4 | 3.8 | | |
| 2021/2020 | 0.5 | 0.5 | 1.4 | 0.6 | 0.3 | 1.1 | 3.5 | | |
| 2022/2021 | 0.2 | 0.5 | 2.7 | 0.6 | 0.3 | 1.2 | 3.1 | | |

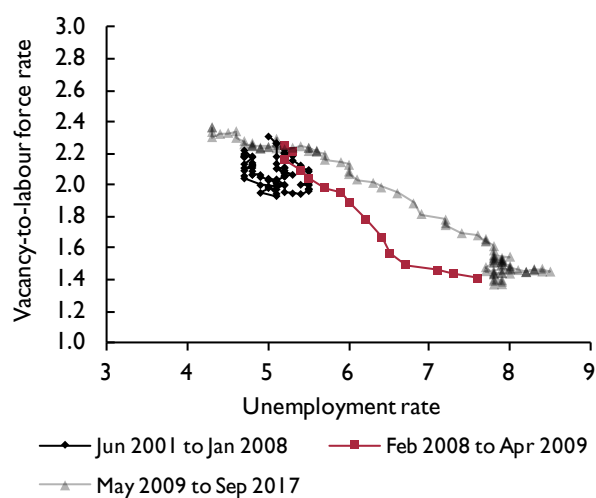
Notes: (a) Includes self-employed, government-supported trainees and unpaid family members. (b) Employment plus ILO unemployment. (c) Population projections are based on annual rates of growth from 2014-based population projections by the ONS.

Figure A9. Employment in recent recessions and recoveries



Source: NIESR calculations.
 Note: Peak is defined by GDP. The lines refer to the evaluation of the level of employment. A square indicates trough of recession; a diamond indicates recovery of pre-recession GDP peak.

Figure A10. The Beveridge curve



Source: NIESR calculations.
 Notes: Population aged 16–64. Dates refer to pre-recession, the Great Recession and the post Great Recession periods, as defined by NIESR's monthly GDP estimates.

Table A8. Public sector financial balance and borrowing requirement

£ billion, fiscal years

| | | 2014–15 | 2015–16 | 2016–17 | 2017–18 | 2018–19 | 2019–20 | 2020–21 | 2021–22 |
|--|---------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Current receipts: | Taxes on income | 385.3 | 400.7 | 430.3 | 448.5 | 471.1 | 494.1 | 515.3 | 540.4 |
| | Taxes on expenditure | 232.3 | 242.6 | 251.6 | 262.3 | 273.6 | 284.6 | 294.9 | 305.6 |
| | Other current receipts | 37.8 | 36.2 | 39.8 | 43.3 | 39.3 | 38.9 | 40.5 | 42.0 |
| | Total | 655.4 | 679.5 | 721.7 | 748.7 | 774.0 | 808.4 | 840.8 | 872.3 |
| | (as a % of GDP) | 35.4 | 35.7 | 36.4 | 36.6 | 36.5 | 36.6 | 36.6 | 36.5 |
| Current expenditure: | Goods and services | 359.6 | 363.9 | 371.3 | 375.4 | 384.3 | 387.9 | 393.0 | 401.5 |
| | Net social benefits paid | 230.6 | 232.8 | 233.6 | 235.3 | 235.9 | 241.6 | 250.0 | 258.9 |
| | Debt interest | 37.0 | 38.3 | 40.0 | 44.3 | 46.0 | 48.2 | 50.2 | 51.7 |
| | Other current expenditure | 50.2 | 49.4 | 49.7 | 55.1 | 55.9 | 66.5 | 69.0 | 71.2 |
| | Total | 677.3 | 684.3 | 694.7 | 710.1 | 722.2 | 744.3 | 762.1 | 783.3 |
| | (as a % of GDP) | 36.6 | 35.9 | 35.0 | 34.7 | 34.1 | 33.7 | 33.1 | 32.8 |
| Depreciation | | 39.0 | 40.1 | 40.8 | 41.1 | 41.2 | 42.5 | 43.8 | 45.2 |
| Surplus on public sector current budget ^(a) | | -61.0 | -44.9 | -13.8 | -2.5 | 10.7 | 21.6 | 34.9 | 43.7 |
| (as a % of GDP) | | -3.3 | -2.4 | -0.7 | -0.1 | 0.5 | 1.0 | 1.5 | 1.8 |
| Gross investment | | 76.0 | 75.0 | 83.2 | 88.9 | 86.8 | 90.8 | 98.3 | 102.7 |
| Net investment | | 37.0 | 34.9 | 42.4 | 47.8 | 45.6 | 48.3 | 54.5 | 57.5 |
| (as a % of GDP) | | 2.0 | 1.8 | 2.1 | 2.3 | 2.2 | 2.2 | 2.4 | 2.4 |
| Total managed expenditure | | 753.3 | 759.3 | 777.9 | 799.0 | 808.9 | 835.1 | 860.4 | 886.0 |
| (as a % of GDP) | | 40.7 | 39.9 | 39.2 | 39.1 | 38.1 | 37.8 | 37.4 | 37.1 |
| Public sector net borrowing | | 97.9 | 79.8 | 56.2 | 50.8 | 38.1 | 26.8 | 20.2 | 9.9 |
| (as a % of GDP) | | 5.3 | 4.2 | 2.8 | 2.5 | 1.8 | 1.2 | 0.9 | 0.4 |
| Financial transactions | | 4.8 | 16.0 | -62.3 | -27.1 | 43.0 | 38.2 | 74.9 | 104.4 |
| Public sector net cash requirement | | 93.1 | 63.8 | 118.5 | 77.8 | -4.9 | -11.4 | -54.7 | -94.5 |
| (as a % of GDP) | | 5.0 | 3.4 | 6.0 | 3.8 | -0.2 | -0.5 | -2.4 | -4.0 |
| Public sector net debt (% of GDP) | | 83.3 | 83.1 | 85.7 | 89.0 | 86.3 | 83.6 | 79.2 | 73.5 |
| GDP deflator at market prices (2015=100) | | 99.7 | 100.4 | 102.6 | 103.9 | 105.7 | 108.2 | 110.6 | 113.1 |
| Money GDP | | 1852.1 | 1904.6 | 1984.7 | 2046.1 | 2121.1 | 2210.4 | 2299.3 | 2387.9 |
| Financial balance under Maastricht (% of GDP) ^(b) | | -5.4 | -4.3 | -2.9 | -1.5 | -1.6 | -1.1 | -0.7 | -0.3 |
| Gross debt under Maastricht (% of GDP) ^(b) | | 87.4 | 88.2 | 88.2 | 86.3 | 85.4 | 83.1 | 80.6 | 78.0 |

Notes: These data are constructed from seasonally adjusted national accounts data. This results in differences between the figures here and unadjusted fiscal year data. Data exclude the impact of financial sector interventions, but include flows from the Asset Purchase Facility of the Bank of England. (a) Public sector current budget surplus is total current receipts less total current expenditure and depreciation. (b) Calendar year.

Table A9. Saving and investment

As a percentage of GDP

| | Households | | Companies | | General government | | Whole economy | | Finance from abroad ^(a) | | Net national saving |
|------|------------|------------|-----------|------------|--------------------|------------|---------------|------------|------------------------------------|-------------------|---------------------|
| | Saving | Investment | Saving | Investment | Saving | Investment | Saving | Investment | Total | Net factor income | |
| 2012 | 6.7 | 3.4 | 9.2 | 9.7 | -4.4 | 2.6 | 11.5 | 15.7 | 4.2 | 1.0 | -0.8 |
| 2013 | 6.2 | 3.8 | 7.2 | 10.1 | -2.7 | 2.5 | 10.8 | 16.3 | 5.5 | 2.0 | -1.5 |
| 2014 | 6.0 | 3.9 | 8.4 | 10.5 | -2.6 | 2.6 | 11.8 | 17.1 | 5.3 | 2.0 | -0.4 |
| 2015 | 6.6 | 3.9 | 6.4 | 10.5 | -1.2 | 2.5 | 11.8 | 17.0 | 5.2 | 2.2 | -0.5 |
| 2016 | 5.0 | 4.2 | 6.5 | 10.3 | -0.4 | 2.4 | 11.2 | 17.0 | 5.8 | 2.5 | -1.1 |
| 2017 | 3.6 | 4.4 | 8.0 | 10.0 | 0.6 | 2.4 | 12.2 | 16.9 | 4.6 | 2.0 | 0.0 |
| 2018 | 3.9 | 4.6 | 8.2 | 10.1 | 0.9 | 2.5 | 13.0 | 17.2 | 4.2 | 0.8 | 0.7 |
| 2019 | 4.4 | 4.7 | 8.1 | 10.3 | 1.4 | 2.5 | 13.9 | 17.5 | 3.5 | 0.6 | 1.7 |
| 2020 | 4.9 | 4.8 | 7.9 | 10.4 | 2.0 | 2.7 | 14.7 | 17.9 | 3.2 | 0.4 | 2.5 |
| 2021 | 5.1 | 5.0 | 7.9 | 10.6 | 2.5 | 2.7 | 15.5 | 18.3 | 2.8 | 0.0 | 3.2 |
| 2022 | 5.2 | 5.2 | 7.9 | 10.6 | 3.0 | 2.8 | 16.1 | 18.6 | 2.5 | -0.3 | 3.8 |

Notes: Saving and investment data are gross of depreciation unless otherwise stated. (a) Negative sign indicates a surplus for the UK.

Table A10. Medium and long-term projections

All figures percentage change unless otherwise stated

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023–27 |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| GDP (market prices) | 3.1 | 2.3 | 1.9 | 1.8 | 1.9 | 1.9 | 1.7 | 1.6 | 1.6 | 1.8 |
| Average earnings | 0.4 | 1.0 | 3.2 | 2.9 | 2.8 | 3.0 | 3.2 | 3.2 | 3.2 | 3.2 |
| GDP deflator (market prices) | 1.7 | 0.5 | 2.0 | 1.7 | 1.3 | 2.4 | 2.3 | 2.2 | 2.2 | 2.3 |
| Consumer Prices Index | 1.4 | 0.1 | 0.7 | 2.7 | 2.7 | 2.1 | 2.0 | 2.0 | 2.1 | 2.1 |
| Per capita GDP | 2.3 | 1.6 | 1.1 | 1.2 | 1.3 | 1.2 | 1.1 | 1.1 | 1.1 | 1.3 |
| Whole economy productivity ^(a) | 0.7 | 1.0 | 0.3 | 0.4 | 1.4 | 1.2 | 1.4 | 1.1 | 1.2 | 1.4 |
| Labour input ^(b) | 2.8 | 1.5 | 1.4 | 1.4 | 0.5 | 0.7 | 0.4 | 0.5 | 0.5 | 0.4 |
| ILO unemployment rate (%) | 6.2 | 5.4 | 4.9 | 4.4 | 4.3 | 4.3 | 4.5 | 4.5 | 4.6 | 5.1 |
| Current account (% of GDP) | -5.3 | -5.2 | -5.8 | -4.6 | -4.2 | -3.5 | -3.2 | -2.8 | -2.5 | -2.3 |
| Total managed expenditure (% of GDP) | 41.0 | 40.0 | 39.2 | 39.2 | 38.3 | 37.8 | 37.5 | 37.2 | 36.8 | 36.4 |
| Public sector net borrowing (% of GDP) | 5.8 | 4.4 | 3.4 | 2.4 | 1.9 | 1.3 | 1.0 | 0.5 | 0.1 | 0.6 |
| Public sector net debt (% of GDP) | 82.2 | 83.8 | 83.6 | 87.1 | 88.0 | 85.3 | 82.0 | 77.1 | 72.6 | 66.6 |
| Effective exchange rate (2011=100) | 110.6 | 116.7 | 105.4 | 100.1 | 102.0 | 102.2 | 102.2 | 102.2 | 102.2 | 101.9 |
| Bank Rate (%) | 0.5 | 0.5 | 0.4 | 0.3 | 0.7 | 1.2 | 1.6 | 2.0 | 2.4 | 3.5 |
| 3 month interest rates (%) | 0.5 | 0.6 | 0.5 | 0.4 | 0.8 | 1.4 | 1.8 | 2.2 | 2.6 | 3.7 |
| 10 year interest rates (%) | 2.5 | 1.8 | 1.3 | 1.2 | 1.6 | 2.3 | 2.9 | 3.3 | 3.6 | 4.1 |

Notes: (a) Per hour.